

# Evaluation of the Academy of Finland

Reports of the Ministry of Education and Culture, Finland 2013:14





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# Table of Contents

|          |  |           |
|----------|--|-----------|
|          | <b>Summary</b>   | <b>10</b> |
| <b>1</b> | <b>Introduction</b>  | <b>12</b> |
|          | 1.1 Background and objectives of the study                                   | 12        |
|          | 1.2 Objectives and evaluation questions                                      | 14        |
|          | 1.3 Approach and methodology   | 15        |
|          | 1.4 Results of the previous evaluation                                       | 16        |
| <b>2</b> | <b>The Academy of Finland</b>  | <b>19</b> |
|          | 2.1 History of the Academy of Finland  | 19        |
|          | 2.2 Mission and goals  | 21        |
|          | 2.3 Key functions of a research council                                      | 21        |
|          | 2.4 Governance   | 22        |
|          | 2.4.1 Respondents' views on the organisational structure                     | 25        |
|          | 2.5 Strategy of the Academy  | 26        |
|          | 2.5.1 The strategy of 2006   | 26        |
|          | 2.5.2 The current strategy   | 27        |
|          | 2.6 Budget   | 28        |
|          | 2.6.1 Additional funding for research programmes                             | 29        |
|          | 2.6.2 Budget of the Research Councils  | 29        |
|          | 2.6.3 Views of respondents on budget allocation                              | 30        |
|          | 2.6.4 Administration costs   | 31        |
|          | 2.7 International comparison   | 32        |
|          | 2.8 Conclusions  | 33        |
| <b>3</b> | <b>The role of the Academy in the Finnish research and innovation system</b> | <b>35</b> |
|          | 3.1 Policy and governance context  | 35        |
|          | 3.2 Recent changes in the Finnish research and innovation system             | 36        |
|          | 3.3 The Academy's role in the Finnish R&I system                             | 39        |
|          | 3.3.1 Complementarity of funding and functions                               | 39        |
|          | 3.3.2 Cooperation with other stakeholders (e.g. Tekes)                       | 40        |
|          | 3.3.3 Relation with universities and research institutes                     | 40        |
|          | 3.3.4 Relationship with the Ministry of Education and Culture                | 41        |
|          | 3.3.5 The Academy as a policy advisor  | 43        |
|          | 3.3.6 Science communications   | 44        |
|          | 3.4 Stakeholder comments on the role of the Academy in a systems perspective | 45        |

|        |   |           |
|--------|---|-----------|
| 3.5    | Conclusions   | 46        |
| 4      | <b>The Academy as a funding organisation</b>                        | <b>49</b> |
| 4.1    | Funding instruments   | 49        |
| 4.1.1  | <i>Views of stakeholders on the portfolio of instruments</i>        | 49        |
| 4.2    | Designing research programmes                                       | 50        |
| 4.2.1  | <i>Views of the stakeholders on research programmes</i>             | 51        |
| 4.3    | Description of funding processes                                    | 51        |
| 4.3.1  | <i>Announcement and submission of calls</i>                         | 51        |
| 4.3.2  | <i>Views of respondents on motivations for funding applications</i> | 53        |
| 4.4    | Review process  | 55        |
| 4.4.1  | <i>Stakeholders' views on the funding process</i>                   | 57        |
| 4.5    | Peer review   | 58        |
| 4.5.1  | <i>Stakeholders' views on the peer review system</i>                | 60        |
| 4.5.2  | <i>Nationality of the peers</i>                                     | 61        |
| 4.6    | Appraisal time  | 61        |
| 4.7    | Confidentiality and conflict of interest                            | 64        |
| 4.8    | Reporting   | 64        |
| 4.9    | Full cost model   | 65        |
| 4.9.1  | <i>Stakeholders' view on the full cost model</i>                    | 67        |
| 4.10   | Size of the grants  | 68        |
| 4.11   | Success rates   | 68        |
| 4.11.1 | <i>Analysis at the level of funding schemes</i>                     | 69        |
| 4.11.2 | <i>Analysis at the level of the universities</i>                    | 69        |
| 4.11.3 | <i>Gender balance</i>   | 70        |
| 4.11.4 | <i>Analysis at the level of the research councils</i>               | 73        |
| 4.12   | Share of funding per research field                                 | 73        |
| 4.13   | Age of applicants   | 73        |
| 4.14   | Outcomes and impacts  | 73        |
| 4.15   | Does the Academy select the best researchers to fund?               | 79        |
| 4.16   | Evaluation at the Academy of Finland                                | 79        |
| 4.17   | International comparison  | 81        |
| 4.18   | Conclusions   | 84        |
| 5      | <b>Internationalisation</b>   | <b>86</b> |
| 5.1    | Introduction  | 86        |
| 5.2    | International strategy  | 87        |
| 5.3    | The position of internationalisation in the Academy                 | 88        |
| 5.4    | Portfolio of activities and instruments                             | 89        |
| 5.4.1  | <i>Opening up Academy Programmes to foreign nationals</i>           | 89        |

|   |  |            |
|---|--|------------|
| 5.4.2   | <i>Bilateral agreements</i>                        | 89         |
| 5.4.3   | <i>FiDiPro</i>                                     | 90         |
| 5.4.4   | <i>ERA-Nets and Joint Programming</i>              | 92         |
| 5.4.5   | <i>Nordic cooperation</i>                          | 92         |
| 5.5   | The views from the stakeholders                    | 92         |
| 5.6   | International comparison                           | 94         |
| 5.7   | Achievement of objectives for internationalisation | 95         |
| 5.8   | Conclusions on internationalisation in the Academy | 97         |
| <b>6</b>  | <b>Conclusions and recommendations</b>             | <b>101</b> |
| 6.1   | The context  | 101        |
| 6.2   | The Academy  | 102        |
| 6.3   | Recommendations                                    | 104        |
| <b>APPENDIX A – Evaluation of the Academy of Finland:<br/>Report of the Peer Review Panel</b> |  | <b>106</b> |
| <b>APPENDIX B – The Academy’s portfolio</b>   |  | <b>114</b> |
| B.1   | Personal grants                                    | 114        |
| B.2   | Non thematic projects and programmes               | 115        |
| B.3   | Thematic programmes                                | 116        |
| B.4   | Grants for infrastructure                          | 120        |
| B.5   | International programmes                           | 121        |
| B.6   | Monodisciplinary programmes                        | 122        |
| <b>APPENDIX C – Data input-output analysis</b>  |  | <b>123</b> |
| C.1   | Appraisal time                                     | 123        |
| C.2   | Funding schemes without competition                | 123        |
| C.3   | Comparison between research organisations          | 125        |
| C.4   | Comparison satisfaction funding process            | 125        |
| <b>APPENDIX D – Online Survey</b>   |  | <b>126</b> |
| D.1   | Characteristics of the survey respondents          | 126        |
| D.2   | Survey results                                     | 128        |
| <b>APPENDIX E – List of Interviewees</b>  |  | <b>141</b> |
| <b>APPENDIX F – Approach and Methodology</b>  |  | <b>144</b> |

# Table of Figures

|  |    |   |    |
|--|----|---|----|
| <i>Figure 1</i> Evaluation approach .....  | 15 | <i>Figure 15</i> Steps in processing applications.....  | 52 |
| <i>Figure 2</i> The Academy in the governance of state institutions in the National Research and Innovation System .....   | 20 | <i>Figure 16</i> Reasons to apply for funding .....   | 53 |
| <i>Figure 3</i> Organisation chart of the Academy of Finland .....   | 24 | <i>Figure 17</i> Ranking of the importance of various motivations for application to the Academy's funding schemes by the different groups of stakeholders .....  | 54 |
| <i>Figure 4</i> Staff Refreshment at AKA.....  | 25 | <i>Figure 18</i> Proposal assessment scales – peer review.....  | 56 |
| <i>Figure 5</i> Current (2010) Strategy of the Academy.....  | 27 | <i>Figure 19</i> Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory – Non-successful applicant survey..... | 59 |
| <i>Figure 6</i> Survey respondents' views on the strategy of the Academy.....  | 28 | <i>Figure 20</i> Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory – Grant holder survey .....            | 59 |
| <i>Figure 7</i> Development of Academy of Finland budget and Finnish GBAORD 2004–2011.....   | 29 | <i>Figure 21</i> How responsive do you find the Academy to inputs from the research community about: Needs for change in research funding rules or schemes? .....   | 21 |
| <i>Figure 8</i> Research funding decisions made from 2004-2011 (x €1000) .....   | 30 | <i>Figure 22</i> How do you see the role of the Academy in the future? Should there be a shift in its activities (basic research versus focus on strategic research)? .....   | 62 |
| <i>Figure 9</i> Shares of the research-funding budget 2004-2011 per council domain.....  | 31 | <i>Figure 23</i> Ratio among number of reviews by nationality of peers (2007-2011) .....  | 63 |
| <i>Figure 10</i> Overhead of AKA 2004-2011.....  | 31 | <i>Figure 24</i> Number of reviewers per country (total 2007-2011).....   | 63 |
| <i>Figure 11</i> Administrative Costs of Research Funders.....   | 32 | <i>Figure 25</i> Change of share in number of reviewers per country between 2007/2008 and 2011/2012 (%-points).....   | 63 |
| <i>Figure 12</i> How well does the Academy communicate about its work and the impacts of its funding? .....  | 44 | <i>Figure 26</i> Appraisal time (in months) of applications received between 2007-2011 .....  | 65 |
| <i>Figure 13</i> To what extent do you agree that Academy funding schemes support the creation of a balanced portfolio across the various research domains.....                            | 50 |   |    |
| <i>Figure 14</i> How responsive do you find the Academy to inputs from the research community about changes in thematic priorities, for example by starting new research programmes??..... | 52 |   |    |



|   |     |
|---|-----|
| <i>Figure 27</i> How far do you feel that the amount of time spent on the application procedure taking into account the success rate of the funding schemes is:....               | 65  |
| <i>Figure 28</i> Full cost model: type of costs.....  | 67  |
| <i>Figure 29</i> Number of applications and success rate (2007-2011) .....  | 67  |
| <i>Figure 30</i> Distribution size of the funding (2010-2011) (x €1000) .....   | 68  |
| <i>Figure 31</i> Gross and net success rate of competitive funding schemes (2007-2011) .....  | 71  |
| <i>Figure 32</i> Applications and success rate by institution (2007-2011) .....   | 72  |
| <i>Figure 33</i> Shares of institutions in funding granted (2007-2011) .....  | 72  |
| <i>Figure 34</i> Number of (granted) applications by gender (2007-2011) .....   | 74  |
| <i>Figure 35</i> Success rates in applications (2007-2011) .....  | 74  |
| <i>Figure 36</i> Proportion of female applicants (2006-2010) ..   | 74  |
| <i>Figure 37</i> Success rates for the different Research Councils between 2007-2012 .....  | 76  |
| <i>Figure 38</i> Research funding by field of science (2007-2011) .....   | 76  |
| <i>Figure 39</i> Number of applicants by age (2007-2011) .....  | 77  |
| <i>Figure 40</i> Number of grantees per age of grantee (2007-2012) .....  | 77  |
| <i>Figure 41</i> To what extent do you agree with the following statements regarding the selection of the Academy grants? .....   | 78  |
| <i>Figure 42</i> How far do you feel that Academy funding schemes contribute to the followings? Responses presented by age group distribution of respondents .....                | 78  |
| <i>Figure 43</i> Grant holders' views on the contribution of Academy funded projects to different results .....   | 80  |
| <i>Figure 44</i> Grant holders' views on the contribution of the Academy's funded projects to different achievements by funding instrument.....                                   | 81  |
| <i>Figure 45</i> Percentage of respondents who agreed completely or to a large extent with the following statements regarding the types of impact of the AKA funding schemes..... | 82  |
| <i>Figure 46</i> Grant holders' views on continuation of their project in the future .....  | 82  |
| <i>Figure 47</i> Evaluations reviewed .....   | 84  |
| <i>Figure 48</i> Origins of foreign applicants for Academy Funding 2007-2011 .....  | 91  |
| <i>Figure 49</i> Applications and grants from 10 most frequent nationalities of foreign grant holders (2007-2011)   | 91  |
| <i>Figure 50</i> Participation of the survey respondents in international research projects .....   | 95  |
| <i>Figure 51</i> Types of international projects in which survey participants are / have been recently engaged .....  | 96  |
| <i>Figure 52</i> In how many different types of international project are / have survey respondents been engaged? .....   | 96  |
| <i>Figure 53</i> Role of participants in the international projects, normalised against the number of respondents....   | 96  |
| <i>Figure 54</i> For Finland, and your unit in particular, what are the challenges in the internationalisation of research? ..  | 98  |
| <i>Figure 55</i> To what extent do you agree that Academy funds facilitate the international networking needed for your research institution? .....                               | 98  |
| <i>Figure 56</i> Survey respondents' views on AKA support for the internationalisation of research.....   | 99  |
| <i>Figure 57</i> Timetable and Interviewees of the Peer Review Panel.....   | 113 |
| <i>Figure 58</i> Average appraisal time 2007-2011 (in months).....  | 123 |
| <i>Figure 59</i> Ranks of research organisations .....  | 124 |
| <i>Figure 60</i> Percentage of respondents who agreed that the following characteristics of the funding process were completely satisfactory.....                                 | 125 |
| <i>Figure 61</i> Basic information on the respondents.....  | 127 |
| <i>Figure 62</i> Organisational affiliation of the survey respondents .....   | 127 |
| <i>Figure 63</i> Positions held by the survey respondents in different country groups: Finland, other EU27 and extra EU27 .....   | 128 |
| <i>Figure 64</i> Profile of the survey respondents .....  | 128 |
| <i>Figure 65</i> Are you a member of a specific research centre or group? .....   | 129 |
| <i>Figure 66</i> Q1. Please provide us with the following basic information: .....  | 129 |
| <i>Figure 67</i> Q2. What is your age range? .....  | 129 |
| <i>Figure 68</i> Q3. Could you please indicate your gender?... ..   | 129 |
| <i>Figure 69</i> Q4. What is your current (main) position? .....  | 129 |
| <i>Figure 70</i> Q5. What type of organisation do you work at?.....   | 130 |
| <i>Figure 71</i> Q6. What is your area of research?.....  | 130 |
| <i>Figure 72</i> Q7. Are you a member of a specific research centre or group:.....  | 130 |
| <i>Figure 73</i> Q8. Are you or have you in the past: .....   | 130 |

**Figure 74** Q9. Please would you estimate the breakdown of your external research funding (that is not institutional funding) in 2012 that comes from:..... 131

**Figure 75** Q10. How attractive do you regard the following Academy of Finland, Tekes and European funding schemes as a funding source for your research activities?..... 131

**Figure 76** Q11. Please indicate, how the schemes of the Academy compare with other national or international funding sources, concerning:..... 132

**Figure 77** Q12. Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory? (Results of the Applicant Survey) ..... 132

**Figure 78** Q12. Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory? (Results of the Grant Holder Survey) ..... 133

**Figure 79** Q13. How far do you feel that the amount of time spent on the application procedure taking into account the success rate of the schemes is: ..... 133

**Figure 80** Q14. To what extent do you agree with the following statements? ..... 134

**Figure 81** Q15. How far do you feel that Academy funding schemes contribute to: ..... 134

**Figure 82** Q16. What is the impact of the Academy's funding schemes? Do they contribute to:..... 135

**Figure 83** Q17. Please indicate the kind of grant you answer for and the first year of funding: (only GHS) ..... 135

**Figure 84** Q18. To what extent were the following motives important to you when you applied for this particular project?..... 136

**Figure 85** Q19. To what extent were the following motives important to you when you applied for this particular project? (only GHS)..... 137

**Figure 86** Q20. Beyond the grant period (only GHS)..... 137

**Figure 87** Q21. Have you engaged in any international research project collaboration since 2004? ..... 137

**Figure 88** Q22. Could you please describe the type of international project(s) in which you are / were engaged? Please select all that apply. .... 138

**Figure 89** Q23. Could you please describe your role in the international project(s) in which you are / were engaged? Please select all that apply ..... 138

**Figure 90** Q24. To what extent do you agree with the following statements about the Academy's support for the internationalisation of research?..... 138

**Figure 91** Q25. For Finland, and your unit in particular, what are the challenges in the internationalisation of research? ..... 139

**Figure 92** Q26. How responsive do you find the Academy to inputs from the research community about:.. 139

**Figure 93** Q27. How well does the Academy communicate about its work and the impacts of its funding? ..... 139

**Figure 94** Q28. How do you see the role of the Academy in the future? Should there be a shift in its activities (basic research versus focus on strategic research)? ..... 140

**Figure 95** Q29. Suggestions, recommendations and other comments ..... 140

**Figure 96** List of interviewees..... 140

**Figure 97** Evaluation approach..... 145



# Summary

The Research and Innovation Council recommended in 2010 that the Academy of Finland should be evaluated. Following a competitive process, Technopolis and ETLA have undertaken this evaluation. A panel of eminent scientists supported us. Their report appears in this volume as Appendix A.

The evaluation has been done in a time when there are pressures for change in the way research is funded, both in Finland and more generally. The importance of several global or ‘grand’ challenges, including climate change, ageing of the population and HIV/AIDS, leads to a questioning of the traditional ‘two pillar’ approach with one agency handling more or less fundamental research and a second funding industrially relevant research and innovation. Thus, at the European level the new Framework Programme Horizon 2020 has separate streams for Excellent Science, Competitive Industries and Tackling Social Challenges. At the Finnish level, the need to fund and coordinate strategic research that tackles social challenges is reflected in the reorganisation of the research institute sector and a proposal to establish a new strategic research fund for them within the Academy. At the same time, there is perceived to be a funding gap between the research funded by the Academy and Tekes’ increasing focus on innovation and entrepreneurship that needs to be filled by strategic and applied research.

The Academy of Finland is the main funding body for scientific research in Finland and has

played a key role in Finland becoming one of the innovation leaders in Europe in recent years. The objectives of the Academy are

- To foster scientific research and its utilisation
- To promote international scientific cooperation
- To serve as an expert organ in science policy questions
- To grant funding for scientific research, researcher training and developing research capabilities
- To execute other science policy expert tasks laid down in the Government decree or assigned to it by the Ministry of Education

The Academy is in many ways an attractive organisation. Its portfolio of funding instruments meets the expressed needs of the Finnish research community and enables Finnish researchers to explore new research areas of importance. The Academy’s schemes contribute to prestige and career opportunities, stronger internal positions for grant holders within their organisation and improved national visibility. The Academy is considered successful in its mission to finance high-quality scientific research. Its review process is high quality. Academy-funded researchers perform better in bibliometric terms than other Finnish researchers.

Researchers are satisfied overall with Academy processes regarding the announcement of the calls, the clarity of the calls and the applications process. Further, they perceive that highly competent and well-respected people run the Academy, which has the trust of the community in general. It intelligently

explores ways to improve its processes and operates at a level of good international practice. Last but not least the Academy is in international comparison a very efficient funding agency that imposes only a low level of administrative burden on researchers.

The main source of dissatisfaction in the community is the implementation of the Full Economic Cost principle. A concern in the policymaking community is that the Academy does not make best use of its opportunities to provide advice on science policy. Some people would like to see the Academy play a role as a ‘champion’ or lobbyist for science but it cannot credibly do this while it is to offer neutral advice on science policy and while it also needs a budget in order to do its funding work.

The Academy has in important respects stayed the same while the world around it has changed – partly because its governance does not encourage change and partly because major change has not been demanded of it. In particular, this leaves the question of how to fund strategic research and research on societal challenges unanswered. The Academy’s strategy is unspecific, both in general and with respect to the international dimension. There is insufficient coordination across the ministries and agencies responsible for research to tackle national needs or to let Finland take strong positions within the pattern of specialisation emerging via the European Research Area. The current period of reflection about strategic research and the state organisations that fund and do research in Finland is therefore an excellent time in which to reconsider the role of the Academy.

We recommend as follows.

1. The Academy’s role should be extended into strategic research funding outside the traditional responsive mode
2. The Academy should play a more active role in science policy, focusing on policy for science (as opposed to ‘science for policy’)
3. The MEC should strengthen its efforts to foster an independent ‘science academy’ function outside the Academy of Finland

4. The Academy’s Board should be strengthened by adding others knowledgeable about research and innovation. The Research Council heads should become observers with speaking but not voting rights
5. The Academy should formulate a new strategy that is specific about what goals and verifiable objectives it intends to reach, as well as the means it intends to use in reaching them. This should not involve setting arbitrary numerical targets but should include specific statements about the Academy’s intended impacts in research and society
6. The Academy should make a clear statement about why it programmes and establish clear procedures and criteria for doing so
7. The Academy should be more explicit about what it believes ‘high risk’/groundbreaking research is, why it should fund it and what specific processes and/or allocations it will use for that purpose
8. The Full Economic Cost system should be revisited and clarified so that it becomes easier to operate, e.g. to implement standardised percentages (for each domain). MEC should consider transferring budget from university core funding to the Academy in order to restore the volume of research funded to its previous level
9. The Academy should develop a new internationalisation strategy that sets geographic and thematic priorities and criteria for changing them over time. Such a strategy should be developed hand in hand with MEC, TEM, Tekes and eventually the other sector ministries and institutes in order to tackle especially the European dimension where national science policymakers at both agency and ministry level need to negotiate with the European level and other Member States in a coherent way. It should explicitly consider the Nordic level
10. MEC and the Academy should jointly explore whether they have sufficient capacity in place to play the needed coordination role in relation to international (especially European) research and innovation policy



# 1 Introduction

## 1.1 Background and objectives of the study

Finland has become one of the innovation leaders in Europe according to the Innovation Scoreboard, performing well above the EU average.<sup>1</sup> The Academy of Finland has played a prominent role in this transition and is one of the key actors in the Finnish research and innovation system. Together with Tekes, the Finnish Funding Agency for Technology and Innovation, the Academy is the main funding body for scientific research. It focuses on funding ‘basic’ research, while the majority of Tekes’ funds are allocated to R&D projects carried out by companies or the research sector in partnership with companies. About 60% of government research funding (excluding direct funding of higher education institutions) is channelled through these two organisations.

While internationally Finland has for many of the last twenty years of rapid economic and technological development been viewed as an exemplar of ‘how to do it’ in research and innovation policy, the Finnish policy system itself moved into a period of uncertainty and greater reflection in the second half of the last decade. Based on a consultative and wide-

ranging strategic review led by the head of SITRA<sup>2</sup> the government announced a new national innovation strategy in 2008. Key elements included

- Raising gross expenditure on R&D to 4% of GDP, two thirds of which should be investment by business.
- Reform of the universities, giving them greater autonomy and generating researcher career paths to supply both academia and industry with enough researchers.
- Reform of sector research and close links between this research and the universities.
- Modernisation and reform of the vocational training system.
- New incentives for business innovation driven from the demand side and affecting low-productivity as well as high-tech branches.
- An increased role for government in stimulating innovation.
- Stronger incentives in research funding for risk taking and internationalisation.
- New technology centres, including the Strategic Centres for Science, Technology and Innovation (SHOKs), to stimulate innovation nationally and regionally.
- Better use of foresight and planning to anticipate the needs for knowledge and skilled manpower.

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1 See: [http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/index\\_en.htm](http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/index_en.htm)

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2 Esko Aho et al, *Proposal for Finland’s National Innovation Strategy*, Helsinki: Ministry of Employment and the Economy, 2008

- Various changes in framework conditions to increase the attractiveness of Finland as a location for innovation and entrepreneurship.<sup>3</sup>

An international evaluation of the Finnish innovation system was carried out in 2009. The purpose of this evaluation was to form an overall picture and to draw up recommendations concerning developments needs. Individual organisations and policy instruments were examined from the perspective of the entire system of innovation activities. A key argument was that, having succeeded broadly in reaching the ‘technology frontier’ and building up large industry, Finland needed to innovate in a new way by “pioneering” innovation, increasingly in smaller companies.

The evaluation highlighted a number of issues to be addressed, including the fragmented structure of the research and innovation system in Finland, the fact that 40% of the professoriate would be retiring within 10 years, the low degree of internationalisation and concern regarding the quality of research. Despite the existence of the Research and Innovation Council, the evaluation argues that the coordination across different ministries’ sector interests in research is poor and, more generally, that the innovation system lacks strong coordinating mechanisms. A key recommendation was to reorganise Finnish ‘sector’ research and to transfer the basic component of that from the government labs to the universities. No development recommendations focusing on specific organisations were given in the evaluation report. Despite the evaluators’ strong push for higher-quality, more internationalised and economically relevant research in the university sector, the Academy is barely mentioned.<sup>4</sup> This is curious in the sense that the central argument about the need to shift the mode of innovation when a country

reaches the technology frontier implies, among other things, increasing the role of ‘basic’ research.<sup>5</sup>

In view of their crucial roles in the national innovation system, the Research and Innovation Council (RIC) recommended in 2010 that international evaluations of the Academy of Finland and the Finnish Funding Agency for Technology and Innovation (Tekes) should be launched in 2011 and 2012. The rationale for the evaluations is that the added value and appropriateness of these organisations should be tested.<sup>6</sup>

Technopolis and VTT carried out the evaluation of Tekes in 2012. It explored among other things the relationship between Tekes and the Academy. The report stated that Tekes is more focused on technical and applied science, for which Tekes funding is larger than Academy funding. The division of labour is clear for those involved. In practice there is a lot of cooperation between Tekes and the Academy at the working level, based on personal relations. The cooperation could however be more strategic, focused on a better joined-up research and innovation policy for Finland and a joint approach to international collaboration.<sup>7</sup>

The last international evaluation of the Academy of Finland was carried out ten years ago, in 2003. This new evaluation in 2013 is therefore timely, especially in light of the recent rather significant reforms in the Finnish research and innovation system. The most important change in the science policy environment of relevance to the Academy is the recent university reform and the new Universities Act, which took effect at the beginning of 2010. The reform formally gives the universities a more independent status as legal persons. Another significant change was in the status of Academy researchers: before the reform they were employed

3 *Government’s Communication on Finland’s National Innovation Strategy to the Parliament*, Helsinki: Ministry of Employment and the Economy, 2008

4 Reinilde Veugelers et al, *Evaluation of the Finnish National Innovation system Policy Report*, Helsinki: Ministry of Employment and the Economy (2009).

5 Erik Arnold and Flora Giaracca, *Getting the Balance Right: Basic Research, Missions and Governance for Horizon 2020*, Brussels: EARTO, 2012

6 Research and Innovation Council of Finland, *Research and Innovation Policy Guidelines for 2011 - 2015* (2010).

7 Geert van der Veen, Erik Arnold, Patries Boekholt, Jasper Deuten, Andrej Horvath, Peter Stern and James Stroyan, *Evaluation of Tekes*. Helsinki: Ministry of Employment and the Economy, 2012

by the Academy; now they are employees of their host universities (or research institutes). In 2009 the Academy and Finnish universities also adopted a full cost model for the calculation of project costs. The law on the Academy changed in 2009. It is now expected to be a more independent science policy actor. The new law put more emphasis on the role of the Academy as a science policy advisory organisation and repositioned the board to make it responsible for strategic management.

There have been also many changes in the science and science policy landscape in the past few years. The European research funding landscape has changed with the emergence of a new pan-European funding body for investigator-initiated research, the European Research Council, in 2007. The new EU framework programme Horizon 2020 extends the scope of research and innovation interventions at the European level. The global map of research is becoming multi-polar. The role of China and the other BRIC countries (Brazil, Russia and India) is growing. There is increasing emphasis on the need for openness in science, including the requirement for open access to research data and publications. It is believed that increased openness will contribute to accelerating scientific progress. Researchers and research funding agencies are under mounting pressure to demonstrate their effectiveness and impact. Science policy objectives have been updated with a view to improving framework conditions for and enhancing the quality and impact of research. The formulation of Grand Challenges has become one of the guiding principles for research funding in many places. Setting objectives based on broad research questions highlights the need for multidisciplinary and interdisciplinary research. Another trend is the growing importance of large research infrastructure. This requires new funding mechanisms and new forms of international cooperation.<sup>8</sup>

The Finnish science system is therefore at crossroads due to both internal and external factors. This evaluation of the Academy of Finland is intended to

provide guidance and input to support the development of the Academy's future role and strategy.

## 1.2 Objectives and evaluation questions

The Ministry of Education and Culture (MEC) commissioned this evaluation. Its aims to assess how the activities of the Academy of Finland should be developed in a changing operating environment to ensure that it can optimally contribute to enhancing the quality and impact of research and the functioning of the innovation system. The evaluation also aims to produce additional information and development proposals to improve the operation of the Academy of Finland, performance steering of the Academy (by the Ministry) and legislation on the Academy.”<sup>9</sup>

According to the Terms of Reference the following aspects had to be included in the evaluation.

1. Success of the Academy of Finland in implementing the tasks specified in the Act on the Academy of Finland and the targets set in the performance agreement between the Ministry of Education and Culture and the Academy.
2. The role of the Academy of Finland in the research and innovation system – do the Academy's structure, the Ministry (performance) guidance and the operating practices serve the overall development of the Finnish research and innovation system? Relationship with key stakeholders?
3. The role of the Academy of Finland in supporting the strategic development of key research actors in particular universities and research institutes.
4. The role of the Academy of Finland in promoting the internationalisation of the scientific community and the body of scientists
5. Division of labour, operation and organisation of the Board, the Research Councils and the Administrative Office.

In principle the evaluation covers the whole period since the previous one (2003). For practical reasons (notably the availability of data) the emphasis of the evaluation is on the last 5 years. The Terms of Reference emphasise the need to carry

<sup>8</sup> See, The Academy of Finland, *The State of Scientific Research in Finland* 2012.

<sup>9</sup> See the Terms of Reference for the evaluation of the Academy of Finland by the Ministry of Education and Culture.

out not purely an ex-post but also a forward-looking evaluation. More precisely the Terms of Reference state that the evaluation should be done from the following perspectives

- Evaluating the current operation of the Academy of Finland
- Evaluating the operation of the Academy of Finland with a view to the future
- Drawing up conclusion and development proposals

### 1.3 Approach and methodology

The work plan of the evaluation comprises six Work Packages (plus a WP on project management). The figure below shows the Work Packages, which involve a range of methods, including desk study, data analysis, a bibliometric review, surveys, interviews,

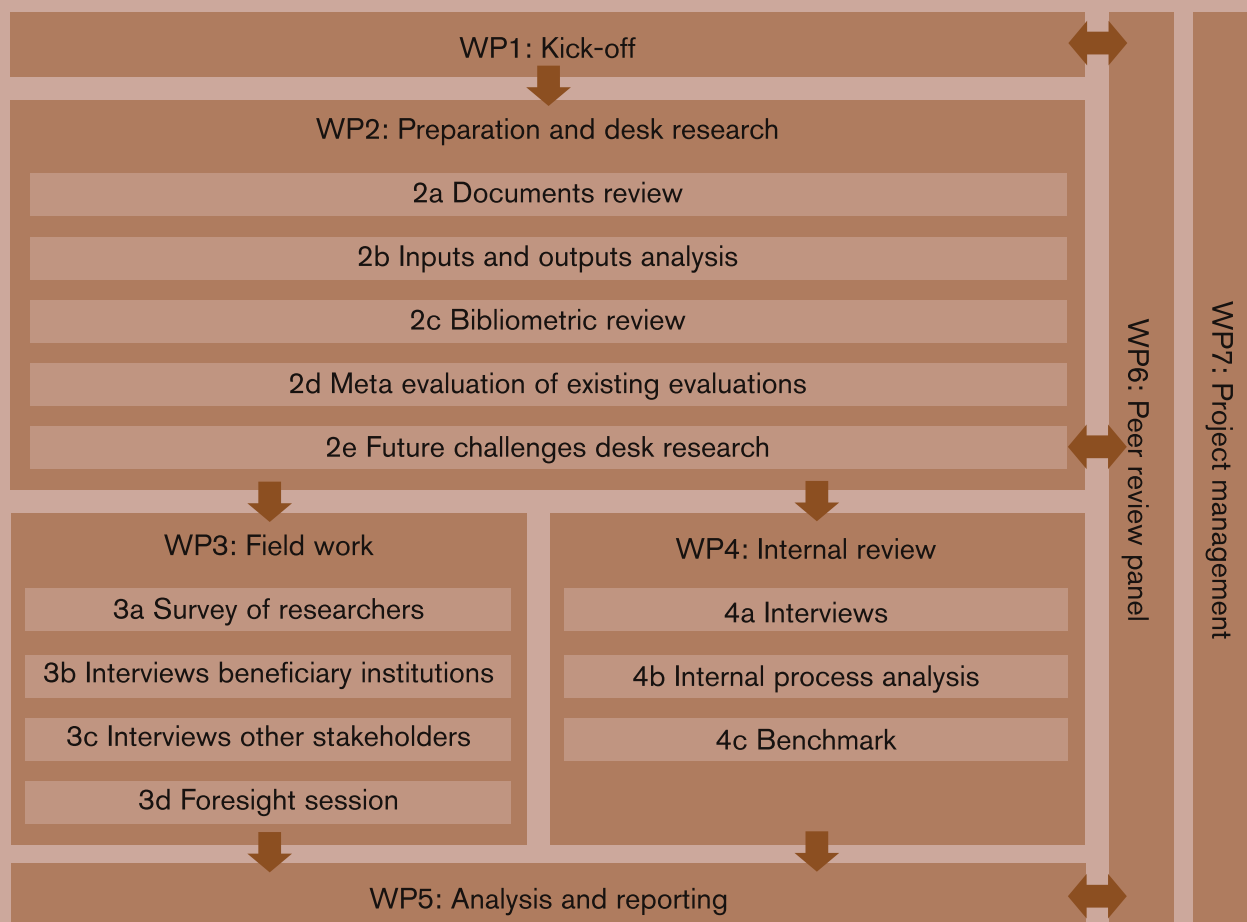
workshop and peer review. The Work Packages are explained in more detail in Appendix F.

WP6 is a panel review of the Academy, conducted by

- Professor Susan Cozzens
- Professor Emeritus Jos WM van der Meer
- Professor Jens Nielsen
- Sir John O'Reilly

This group of senior scientists with strong experience of research policy and management reviewed an earlier draft of this report and a self-evaluation produced by the Academy of Finland. It met with Academy management and other key stakeholders in Helsinki for two days during April 2013 and produced its own report, shown here at Appendix A.

Figure 1 Evaluation approach



## 1.4 Results of the previous evaluation

The previous international evaluation was done in 2003. The international panel had a positive impression of the performance of the Academy of Finland. The panel made a number of recommendations intended to help the Academy in making its performance “even better”.

1. The Academy's contribution to research policy should be re-evaluated in relation to the role that it has, can, and should play in the larger national system with the purpose of increasing its effectiveness and its sustainability.
2. Consideration must be given to the establishment of a forum located somewhere in the institutional space between the Academy and Science and Technology Policy Council of Finland (now Research and Innovation Council), perhaps involving university rectors and directors of the government research institutes, to help strengthen horizontal connectivity with other participants in the innovation system who have interest in, and a need for, high quality research. In this, we believe that the exploration of more robust career structures for researchers would be helpful in strengthening connectivity.
3. The Ministry of Trade and Industry (now the Ministry of Employment and the Economy) and the Ministry of Education (now the Ministry of Education and Culture) should make a fresh effort to establish closer working relationships between Tekes and the Academy.
4. The remit, composition, and function of the Board should be reconsidered in the light of the need to develop more broadly based research policies which would encourage interdisciplinarity, develop more cross-council cooperation, and promote greater connectivity with other research producing institutions and organisations.
5. To help strengthen the Board to become a more effective science policy organisation, the Academy must consider extending the tenure of Board members and staggering the dates of their appointment. Changing membership every three years, as is done currently, leaves the collective memory of the Board repeatedly depleted, undermines continuity and limits the effectiveness of policy development.
6. In future, the Academy should build upon its expertise in research policy and in funding of scientific excellence through experimenting with more broadly based project

evaluation systems, in its efforts to foster interdisciplinarity and stimulate cross council research.

7. To ensure that existing resources are effectively utilised and that resources continue to be available for new initiatives, the Academy should insist on an exit strategy as a prerequisite for successful bids for research programmes and centres of excellence. If more broadly based expert systems are developed, we stress the need not only for a great deal of experimentation but also for openness and transparency in the procedures adopted.
8. The most successful Academy Research Fellows should be able to get a 3–5 year extension of their appointment, following a peer review evaluation. In addition, the universities, and the Ministry of Education and Culture should jointly formulate a national policy to ensure continuity in the career development of researchers who want to pursue an academic career. One attractive model would be a tenure-track system.
9. The Academy, in cooperation with the Finnish research community at large, the universities, and the main players of the Finnish research system must develop transparent and scientifically sound solutions to the problems of the evaluation of interdisciplinary projects.
10. The Academy must review the level of funding for the social sciences and humanities with a view of satisfying itself that the funds available are sufficient to allow researchers in these areas to participate fully in the Academy's programmes and to promote interdisciplinary research.
11. The Academy must ensure that it has established areas of excellence that are of sufficient credibility to attract researchers internationally and that the Academy considers an initiative to develop further Finland as an international research “attractor”.
12. The procedures governing the many funding forms of the Academy should be reviewed, rationalised and shortened.
13. The Academy must devote more effort to clarifying the *raison d'être* for targeted funds and the selection processes that govern both the choice of topics and the allocation of resources to research programmes and centre of excellence programmes.<sup>(10)</sup>

As a result of this evaluation, the Academy implemented a number of changes.

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10 Michael Gibbons, Patrick J Dowling, Gretty Myrdal and Ralf F Petersson, *International Evaluation of the Academy of Finland, Report 2004* 16, Helsinki: Ministry of Education, 2004 (2004).



- Ad recommendation 1: During 2005-2006, the Academy carried out a project, the aim of which was to investigate the impacts of research and research funding, the level and structure of science and the future challenges of the research system. The project resulted in a series of publications (targeting impact including methodology, scientific level of Finnish research, foresight, high-risk research). Developing methods for assessing the impact of research is still an ongoing project (at the moment together with Tekes, commissioned by the Finnish Research and Innovation Council). Foresight studies and surveys of the scientific level of Finnish science are also ongoing.
- Ad recommendation 2: No formal body has been formed. However, the Academy has strengthened collaboration with Universities Finland UNIFI and informal contacts with individual universities. Contacts with key strategic partners and stakeholder groups increased. New funding schemes targeting researcher mobility were introduced and the Academy has participated in the design of SHOKs and other instruments for research – industry cooperation.
- Ad recommendation 4 and 5: A new Act on the Academy of Finland entered into force in 2009. The Act changed the composition of the Academy's Board in the way the evaluation had recommended: "...The Board shall consist of the Academy President and the Chairs of the Research Councils and three members appointed by the Finnish Government for three years at a time who are required to have experience in research work and sufficient science policy expertise. The Government shall appoint a Chair of the Board and a Vice Chair from among the latter. A person may be appointed a member of the Board for no more than two consecutive terms." Almost without exception, Board members are appointed for two successive three years terms. Thus members serve usually for six years. All members are not replaced at the same time. The President is appointed for five years. The President's term is not tied to the Board's term.
- Ad recommendation 6 and 9: The Academy commissioned a study *Promoting Interdisciplinary Research: The Case of the Academy of Finland* from a research group. One of the objectives of the study was to recommend how the Academy could improve its capabilities in fostering interdisciplinary research.<sup>(11)</sup> Also a PhD thesis was published on *Interdisciplinary accountability in the evaluation of research proposals: Prospects for academic quality control across disciplinary boundaries*. A question about multi/inter/trans-disciplinarity was incorporated into grant application forms and more attention is now given to the interdisciplinarity of the review panels. Improvement of the review of applications in this respect is an ongoing process.
- Ad recommendation 7: In 2006 the Academy introduced allocated exit funding for those CoEs which were involved in the CoE Programme 2000-2005 but did not get funding in the succeeding programme. Later on (2009) the Academy gave up this kind of funding. In the impact Evaluation of the Finnish Programmes for Centres of Excellence in Research 2000–2005 and 2002–2007 the exit strategy was discussed extensively and in detail. Nowadays the Academy emphasises universities' responsibility in this respects and an exit strategy is on the agenda in the funding negotiations. In addition CoEs themselves have to discuss and report on their future after the CoE period (exit strategy).
- Ad recommendation 8: The Academy organised two negotiations with Universities Finland UNIFI. The Academy was ready to commit itself to 3-year extension if the universities also committed themselves to at least an equal fixed term contract after Academy's funding. The parties could not come to an agreement. More recently, the implementation of tenure track system has rectified this problem.
- Ad recommendation 10: This taken into consideration when the funds are allocated by the Board to different purposes and especially when decisions are made about new research programmes to be launched. Researchers in the areas of social sciences and humanities are nowadays actively taking part in the Academy's interdisciplinary research programmes.
- Ad recommendation 11: The Academy has made several efforts to position Finland internationally and to develop Finland as an international research "attractor". The most visible effort is the joint funding scheme 'Finland Distinguished Professor Programme' (FiDiPro) in 2006 with Tekes. Other initiatives are the ERAMORE Network project Connect Finland, funded by the European Commission (researchers mobility portal) and signing the European Charter for

11 See: [http://www.aka.fi/Tiedostot/Tiedostot/Julkaisut/8\\_05%20Promoting%20Interdisciplinary%20Research\\_%20The%20Case%20of%20the%20Academy%20of%20Finland.pdf](http://www.aka.fi/Tiedostot/Tiedostot/Julkaisut/8_05%20Promoting%20Interdisciplinary%20Research_%20The%20Case%20of%20the%20Academy%20of%20Finland.pdf).

Researchers and Code of Conduct for the Recruitment of Researchers in 2009.

- Ad recommendation 12: The Academy has renewed its funding schemes fundamentally in 2005 and 2010. The aim of the 2005 reform was to bring the funding schemes into line with the Academy's strategy. Some funding instruments were discontinued (like the scheme to hire postdoctoral researchers, incentive funding for Academy Research Fellows and minor funding schemes). Some new ones were launched (such as the FiDiPro scheme) and the introduction of joint evaluation panels, a changeover to online services and more attention to the review of the multidisciplinary, transdisciplinary and interdisciplinarity of projects. The aims in 2010 were to streamline the Academy's funding system and to increase the flexibility, efficiency and effectiveness of the research funding. Major changes include the introduction of time limits for the completion of personal funding schemes, the rule of 'one application from the same applicant' for certain schemes, the announcement of the major funding schemes in autumn call, the requirement for a mobility plan in each application and the discontinuation of some funding schemes (like grants for Senior Scientists, researcher training and research abroad, preparation of joint international projects, researcher mobility in working life, and doctoral studies of employed persons).
- Ad recommendation 13: There have been serious efforts. The Academy commissioned a survey and series of interview which aimed at developing the Academy's research programmes. Since 2006 there has also been a working group for helping the Vice President to prepare the Board meeting by formulating Council's common proposal of the research programmes to be started. In 2011 the Board of the Academy identified a series of grand challenges that will be given priority focus in research over the next few years. However, these efforts have not been sufficient as the customer and stakeholder surveys show.

## 2 The Academy of Finland

The Academy of Finland is a central body in the Finnish research and innovation system which funds basic research and research activities especially in universities, though to a lesser degree, in government research institutes. There is a policy goal to promote RDI activities in polytechnics - universities of applied science, as they call themselves - especially to strengthen the competences and competitiveness of the public agencies and the private business community in their regions. So far, universities of applied science have not been competing for the research funds of the Academy, but it can be foreseen that this will happen in the future.<sup>12</sup> Tekes (The Finnish Funding Agency for Technology and Innovation) is parallel with the Academy and funds applied research, technological development activities, and innovation, and is especially targeting its funding to innovating companies. The Academy is under the Ministry of Education and Culture while Tekes is under the Ministry of Employment and the Economy.

This arrangement with a powerful research funding agency under an education or science ministry on the one hand and a strong innovation agency

under an industry ministry on the other has become known as a 'two pillar' system<sup>13</sup> in the Nordic research and innovation policy discussion. A theme emerging from this evaluation is that a two-pillar system may no longer be an adequate structure for research and innovation policymaking and implementation in the context of globalisation and the increasing importance of global challenges that cut across many more sectors of society than just education and industry.

### 2.1 History of the Academy of Finland

The Academy of Finland in its present form was founded in 1970. The research council system in Finland however is much older. The first Act regarding the so-called 'old' Academy of Finland was passed in January 1939. This old Academy comprised 12 Academicians (eight scientist and four artists) and it was launched to promote the development of scientific research and the arts. In 1950 a collegiate proposal by the Academicians led to the founding of the Research Council for the Natural Sciences and the Research Council for the Humanities, which together formed the Central Board of

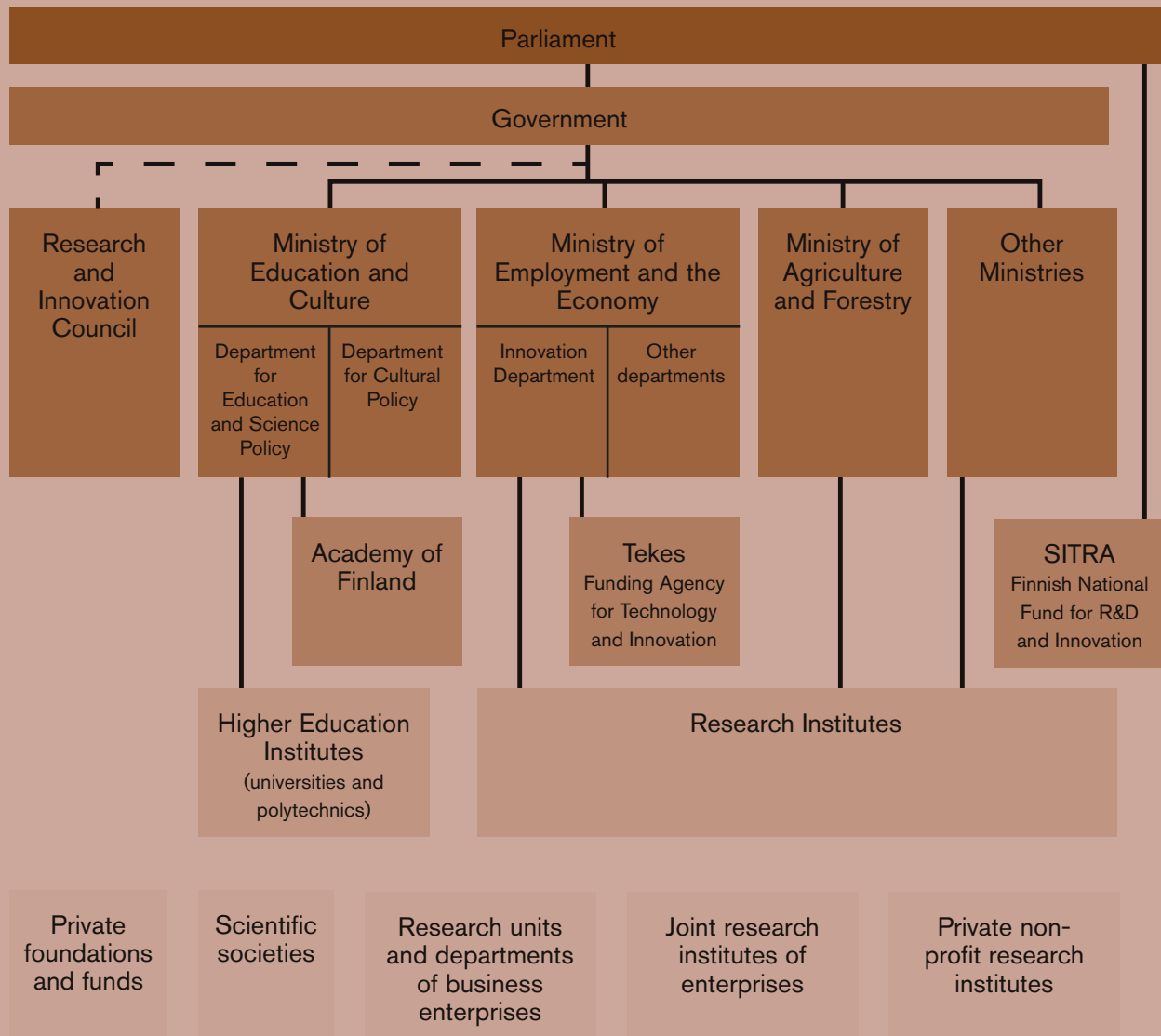
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12 See Peter Maassen, Outi Kallioinen, Päivi Keränen, Markku Penttinen, Jack Spaapen, Roswitha Wiedenhofer, Matti Kajaste, Johanna Mattila, *From the bottom up: Evaluation of RTDI activities of Finnish Universities of Applied Science*, Publications of the Finnish Higher Education Evaluation Council, 7:2012.

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13 Gunnar Björkstrand, *NORIA Vitbok om nordisk forskning och innovation*, TemaNord 2004:502, Copenhagen: Nordic Council of Ministers, 2004

Figure 2 The Academy in the governance of state institutions in the National Research and Innovation System



Research Councils. Covering the whole field of scientific research, the two councils were charged with providing expert advice and issuing grants for research in their respective fields.

In 1969 the 'old' Academy of Finland was terminated and a new organisation was set up in its place. Organised around research councils, the new Academy's responsibilities included funding high quality research, coordinating research funding and making science policy. The new Academy of Finland started in 1970 and comprised the Central Board of Research Councils, the Academy's highest

decision-making body, six research councils and an Administrative office.

In 1983 a new, seventh research council was set up; the Research Council for the Environmental Sciences. A reorganisation in 1995 saw the number of research councils reduced to four: the Research Council for Culture and Society, the Research Council for Natural Sciences and Engineering, the Research Council for Health and the Research Council for Environment and Natural Resources. At the same time the Central Board of Research Councils

was replaced by the board of the Academy of Finland, which was led by the Academy's President.<sup>14</sup>

## 2.2 Mission and goals

The most recent Act on the Academy of Finland is dated 2009. This Act states that the Academy of Finland is a central science administration agency that operates within the administrative sector of the Ministry of Education and Culture. The Academy is Finland's leading source of funding for scientific research. The mission of the Academy of Finland is: "to finance high-quality scientific research, act as a science and science policy expert, and strengthen the position of science and research. The Academy works to contribute to the renewal, diversification and increasing internationalisation of Finnish research."<sup>15</sup>

The formal objectives of the Academy as laid down in the Act are

- To foster scientific research and its utilisation
- To promote international scientific cooperation
- To serve as an expert organ in science policy questions
- To grant funding for scientific research, researcher training and developing research capabilities
- To execute other science policy expert tasks laid down in the Government decree or assigned to it by the Ministry of Education

According to its performance contract, as the central body administering and funding research in the sector of the Ministry of Education and Culture, the Academy of Finland should support high-quality research by allocating long-term financing of specified duration based on scientific quality. The Academy of Finland is committed to supporting the renewal of research, multidisciplinary, new approaches and potential scientific breakthroughs. The strengthening of Finnish science also requires

internationalisation. The Academy should provide opportunities for international cooperation to Finnish researchers and support European and global cooperation. The Academy's objective is also to reinforce the role of science in resolving the grand challenges faced by society. Therefore the results and expertise from the research it has funded should contribute to innovation in societal domains as well as in industry. Finally, the Academy is providing science policy expertise for various stakeholders and the Ministry in particular.<sup>16</sup>

## 2.3 Key functions of a research council

Research councils are funders of research that is primarily 'bottom-up' or researcher-initiated and is mainly judged on excellence. Generally they are described as funding 'basic' research, though in reality they normally fund applied research as well. Cognitively, the distinction between basic and applied research is problematic, since it is based on intent: work undertaken primarily for the advancement of scientific knowledge, without a specific practical application in view.<sup>17</sup> This is the definition the OECD uses for the collection of international R&D statistics. Stokes has shown that a lot of what we commonly call 'basic' research is not 'blue skies' or curiosity driven, but is rather pursued with the explicit aim of solving problems.<sup>18</sup> Godin, not unreasonably, argues that the idea of 'basic' research would have been dropped as incoherent a long time ago were it not for the fact that most of the

14 See the three-volume history that has been published (in Finnish) on the Academy of Finland. Volume I: Top Individuals and Committees (1948–1969) by Allan Tiitta. Volume II, Society and Research (1970–1988), by Dr Maritta Pohls, Volume III, Competition and Cooperation discusses the years 1989–2003, by Hannu Heikkilä,

15 See website Academy of Finland: <http://www.aka.fi/en-GB/A/Academy-of-Finland/>

16 See Performance Agreement between the Academy of Finland and the Ministry of Education and Culture for the period 2011 – 2012.

17 Organisation for Economic Cooperation and Development, *The Measurement of Scientific and Technical Activities: Proposed Standard Practice for Surveys of Research and Development* (Frascati Manual), DAS/PD/62.47, Paris: OECD, 1962

18 Keith Sequeira and Ben Martin, *Physics and Industry*, Brighton: SPRU, 1996



developed world is committed to collecting statistics about it.<sup>19</sup>

In political or governance terms, research councils tend to equate 'basic research' with researcher-initiated work, funded based on merit and without reference to utility or conformity with one or more thematic priorities. The Academy is the main funder of basic research (in this sense) in Finland and therefore an important actor in the Finnish research and higher education system. The Academy as a research council has a role as a science policy maker, through deciding broad allocations of money among the councils, setting thematic agendas via programmes and addressing structural problems through funding instruments such as Centres of Excellence (CoE) as well as offering science policy advice – in general and in response to specific governmental assignments. It should produce (and increasingly it is expected also to demonstrate) immediate and longer-term effects especially in the research community but also in policy and other parts of society. It performs these tasks in a rapidly changing context and needs to co-evolve with that context in order to remain relevant and maintain a strong position for the Finnish national research and innovation system into the future.

To achieve this complex set of tasks, the Academy has four groups of core processes

- *Agenda setting* involves developing and using 'strategic intelligence' about the national research and innovation system (such as evidence from consultations, the regular State and Quality of Research reviews and evaluations) to identify the need for intervention – whether by maintaining existing funding instruments, innovating new ones or setting new thematic or interdisciplinary priorities (including deciding how much money to spend through each of the four Research Councils). It therefore involves both study and design work and is external as well as internal.
- *Operations* focus on the implementation of the various measures, most often through the familiar cycle of calls, assessment using peer review and panels, funding decisions, monitoring and reporting. Other operations are involved in

internationalisation and measures to promote the take-up or commercialisation of research results and science communications.

- *Governance and steering mechanisms.* The processes need a structure and steering mechanisms to be put in place. While the government lays down the formal structure of the Academy, it is up to the Academy to decide on a detailed division of labour and ensure that it works. This includes ensuring that the research councils and the overall Board function well and connecting the work of the Academy to the steering signals the MEC supplies through the annual performance contracts.
- *Administration* supports the scientific decision-making as well as the normal 'housekeeping' functions such as finance, human resource development, IT and the provision of monitoring and reporting information. A key function is the provision of up to date web-based proposal submission and assessment tools.

In this chapter we address the internal organisation. The Academy's function in policy advice is examined in chapter 3.

## 2.4 Governance

The governance structure of the Academy consists of the Board, four Research Councils and an Administration Office. The highest decision-making body of the Academy is its Board, which directs and supervises the Academy's operations. It consists of the Academy President, the Chairs of the Research Councils, and three members appointed by the Finnish Government. These Board members are required to have experience in research and to have science policy expertise. At the moment these three members comprise two representatives of universities and one with an industrial R&D background. The Chair and Vice Chair are selected from among the persons the Government appoints. A person may be appointed to the Board for no more than two consecutive terms of three years each. Though not formally members, the Vice President for Research and Vice President for Administration are present at board meetings.

The Board of the Academy decides upon matters concerning

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19 Benoît Godin, 'Measuring science: is there "Basic Research" without statistics?' *Social Science Information*, 42 (1), 57-90

- The Academy's general policy lines and objectives, taking into account the objectives agreed on with the Ministry of Education and Culture
- The spheres of activity of the Research Councils and the promotion of fields of research that are covered by two or more Research Councils
- Plans, budget proposals and performance agreements regarding the Academy's operations and finances
- The distribution of appropriations among Research Councils and for different purposes
- The rules of procedure
- The approval of the financial statements and annual report
- Other matters with far-reaching consequences or with a fundamental importance for the Academy

The Board is responsible for the Academy's strategy, science policy advice and the allocation of research appropriations to Research Councils. In addition, it decides on the appointment of Academy Professors, FiDiProfessors, the selection of research teams in the Centre of Excellence programmes and the launching of new research programmes.

The President, appointed by the Government for no more than five years at a time, is a member of the Board. The President must be a distinguished scientist or scholar. He or she must also be versed in science and university administration, and have proven management skills and management experience. The President decides on research cooperation agreements that do not entail a financial commitment, provided that they do not fall within the scope of activity of the Board or a research council. The President also decides on agreements that fall within the scope of activity of multiple Research Councils if there is funding allocated to these activities.

The Academy of Finland operates four research councils.

- Research Council for Biosciences and Environment
- Research Council for Culture and Society
- Research Council for Natural Sciences and Engineering
- Research Council for Health

The Government appoints the Chair and no more than ten other members of the Research Councils for three years at a time. The members of the Research Councils select the first and second Vice Chairs from amongst themselves. The Government seeks to ensure that the Board and Research

Councils cover a wide range of scientific fields and have high levels of scientific expertise. The Research Councils carry out the Academy's tasks within their respective field of expertise. Research Council members continue to work at their own university or research institute. Decisions are made by simple majority. If there is a tie, the Chair has the casting vote.

The duties of the Research Councils are

- To approve an action plan and a financial plan for the Research Council, as well as a plan for the use of the funds allocated to the scope of activity of the Research Council
- To adopt, within the limits of the appropriations and budget authority allocated, international agreements and other science promotion agreements or similar documents that fall within the scope of activity of the research council
- To make proposals for the promotion of science
- To award Academy grants, funding towards the salaries of Academy Professors and Academy Research Fellows and grants to Postdoctoral Researcher's projects
- To decide on any far-reaching or in principle significant statements that fall within the scope of activity of the research council, insofar as the matter is not the responsibility of the Board
- To monitor the results of projects funded by the research council and to approve the final reports of the projects it has funded
- To decide on proposals and statements to be submitted to the Board or the Administration Office

When matters fall within the scope of two or more Research Councils the Board shall decide whether responsibilities are to be transferred to a subcommittee. Only the Board can appoint this subcommittee, with members of the Board and of the Research Councils acting as members. For example, a subcommittee makes the decisions for the Centres of Excellence programme.

The Academy also has an Administration Office, which does all the necessary groundwork to prepare and implement the official decisions of the Academy Board and the Research Councils. The staff is also responsible for the execution of the decisions, preparation of science-policy surveys and related plans, and participation in a number of national and international working groups. The Academy President and two Vice Presidents head the Administration Office. The Vice President for Administration

is responsible for running and developing the administration, while the Vice President for Research is in charge of science-policy planning and research funding development. The Administration Office is organised into the following units

- Four units that correspond to the Research Councils: these research units are responsible for preparing, presenting, as well as executing and monitoring matters within the scope of the Research Councils
- The Administration Unit: is responsible for personnel management and human resource development, general administration and legal counselling
- The Communications Unit: is in charge of the Academy's internal and external communication; it takes care of media contacts and works to raise the public understanding of science and research
- The Finance Unit: deals with the Academy's budget, accounting, payment transfers and monitoring as well as financial planning and monitoring
- The Information Management Unit: is responsible for maintaining the information technology and infrastructure as well as for purchasing user support and training services
- The Management Support Unit: is responsible for the Academy's strategy setting process and for the planning and monitoring of the Academy's operations. The Unit is also

responsible for the evaluation and foresight of the impacts of research

- The Programme Unit: prepares, presents, executes as well as monitors the Academy's research programmes and the Finnish programmes for Centres of Excellence in research in cooperation with the Research Councils and other units at the Academy's Administration Office. The Unit is also entrusted with the implementation of the strategies established for the various programme activities as well as with the coordination, development and evaluation of the research programmes

There is one Internal Auditor, working directly under the President, who audits projects that are funded from the EU budget, and manages and coordinates the Academy's internal auditing activities.

Until 2012 there was also an International Relations Unit. Its activities and responsibilities were transferred to the four Research Councils, the Programme Unit and the Management Support Unit. This reorganisation derived from the Academy's strategy to mainstream internationalisation in all of the Academy's funding schemes.

In total, the units contain a staff of about 150 people. The President of the Academy appoints

Figure 3 Organisation chart of the Academy of Finland



Source: Academy of Finland

personnel, unless otherwise provided in the rules of procedure.<sup>20</sup>

## 2.4.1 Respondents' views on the organisational structure

Stakeholders have very positive views on the personnel of the Academy. They expressed confidence that the Academy is run in an efficient way by highly-educated, dedicated staff with well-defined transparent procedures that are professionally executed. At the same time several expressed reservations, mainly about the fact that the Academy employs civil servants who occupy permanent positions. While this continuity generates significant expertise among the staff and increases the professional standards of the organisation, some observers felt that staff turnover and organisational attitude change might happen at a slower pace than desirable as a result. The view of the respondents does not seem to correspond with actual staff turnover (see figure below). On average about 13% new staff was entering the Academy in the last six years. One year, the proportion exceeded 20%. However, unlike organisations such as the US NSF, the Academy does not use seconded academics in the staff.

Stakeholders emphasised the importance of the Research Council members in the Academy's organisation. The intention to have a fair distribution in terms of gender, discipline and background when the Ministry appoints Council members based on

suggestions received from the research community is generally welcomed. The built in rotation system – i.e. half of the members are renewed at once, while the other half stays on – ensures continuity and renewal at the same time. Increased international orientation of the members would be an additional benefit according to the stakeholders interviewed. A frequent criticism regarding the system is that it allows Council members to apply for Academy funding. However, this is common practice all over Europe, and some funding agencies even allow their board members to apply for funding. The Academy has very detailed procedures in place to avoid a conflict of interest when handling proposals from council members. The established procedures seem to be working well.

Views regarding the composition of the Board were less favourable, and criteria for the selection of the Board members do not seem to be clearly understood. Interviewees explained that reforming the Board is a big challenge and therefore the status quo has been maintained for some time. Regarding the division of labour between the Board and the Research Councils some argue that the Board allows the Research Councils to act independently, while others argue that the relation between the Board and the Research Councils is too tight. Interviewees also raised the possibility of tension building up between the Board and the research councils, since the Board decides on the strategic programmes.

At the level of the organisation some of the interviewees felt that Councils do not have enough freedom and flexibility to decide on the allocation of the Research budget and thus are unable to steer their funding in a strategic way or respond to the needs of their scientific fields. Another factor that limits the work of the Councils is that the Academy Board decides on the budget of the research pro-

20 Sources used: The Act of the Academy of Finland (2009), Government Decree on the Academy of Finland, November 2009, Rules of Procedure Academy of Finland (2009), Performance Agreement between the Academy of Finland and the Ministry of Education and Culture for the period 2011 – 2012 and the website of the Academy.

Figure 4 Staff Refreshment at AKA

|                   | 2007  | 2008  | 2009  | 2010  | 2011  | 2012 |
|-------------------|-------|-------|-------|-------|-------|------|
| <b>Resigned</b>   | 10,2% | 8,4%  | 3,1%  | 6,7%  | 11,3% | 4,6% |
| <b>New staff*</b> | 15,7% | 20,6% | 11,3% | 12,2% | 10,7% | 7,9% |

\* Including those coming back from leave of absence, excluding maternity or other family based leave  
Source: Academy of Finland

grammes. The Councils have to compete for funding for ‘their’ research programmes and there is no incentive for joint (multidisciplinary) programmes. These patterns were also observed by external stakeholders who pointed out barriers to multidisciplinary project funding and the need for more strategic planning and budget allocations.

Critics addressed what some saw as a silo structure as well, which was said to discourage communication among the research councils, prevent cooperation and encourage conservatism. The current organisational structure is seen as being less appropriate for supporting multidisciplinary research and new emerging fields. For the latter the Academy has research programmes, but it is felt that the Councils defend their own topics very carefully rather than being advocates for a more integrated approach. In the light of the growing emphasis on Grand Challenges and multidisciplinary research, the Academy may need to be more responsive to multidisciplinary research.

## 2.5 Strategy of the Academy

The Academy developed two strategies during the period in scope to the evaluation –respectively in 2006 and 2010.

### 2.5.1 The strategy of 2006

This strategy contains a vision of the future of the Academy. In this vision the Academy was the prime funding agency for competitive basic research in Finland. It was able to increase the availability of competitive research funding significantly and it became a well-respected research funding agency and partner in the European research funding system. The Academy selectively took part in funding high-level research infrastructures in Finland and abroad and provided incentives for researchers with a view to increasing the appeal and strengthening the continuity of research careers. All of this was to be carried out in close cooperation with universities, research institutes, research funding agencies, business and industry and public administration.

The strategy identified two main functions for the Academy

- To provide the necessary preconditions for high-quality research, researcher training, internationalisation and the application of research results
- To promote the development of science and strengthen the impacts of research by foresighting changes in different disciplines and in the research system and by allocating funding to the highest-quality and the scientifically most innovative research

The 2006 strategy contains five headlines

- **Resources:** e.g. larger and longer-term funding arrangements, involvement in ever more comprehensive joint funding schemes and funding for significant national and international infrastructure projects.
- **Strategic partnerships:** the Academy works closely with other partners, such as universities, Tekes, other funding agencies and international partners.
- **Impacts of research:** promoting interdisciplinary research, funding in larger blocks and promoting interaction and cooperation between researchers and knowledge end-users as part of the creation of a value chain.
- **Developing research careers:** e.g. increasing the number of posts for Academy Research Fellows developing joint funding schemes with universities and incentives and opportunities for researcher mobility.
- **Significance and visibility of science:** e.g. initiatives in the public debate on science policy, the goals of science, its impacts and ethics and encourages researchers to disseminate their research results as widely as possible.



## 2.5.2 The current strategy

Figure 5 Current (2010) Strategy of the Academy

| Strategic objectives      | Enhancing the quality and impact of research  | Strengthening the position of scientific research in the Finnish research and innovation system   | Strengthening the international position and impact of Finnish science  |
|---------------------------|---|---|---|
| Activities / initiatives  | <ul style="list-style-type: none"> <li>▪ Promotion of research that is both of high international quality and ethically sound</li> <li>▪ Establishing internationally attractive research environments</li> <li>▪ Promoting the discovery of new scientific breakthroughs, and</li> <li>▪ Research that seeks new multidisciplinary and interdisciplinary subjects and approaches</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Strengthening welfare, education, culture and economic competitiveness</li> <li>▪ Enhancing the contribution of high-level scientific research to development aimed at new innovations, and putting to the best possible use, both in public decision-making and in business and industry, the results and expertise from the research it has funded</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Emphasises the role of scientific research in resolving the grand challenges facing humankind.</li> <li>▪ Contributes actively to the building of the European Research Area in key areas of research strength.</li> <li>▪ Provides opportunities for Finnish researchers to collaborate with international colleagues with a view to enhancing the quality and impact of research</li> </ul>  |
| Methods of implementation | <ul style="list-style-type: none"> <li>▪ Providing consistent and fixed-term funding for world-class innovative research that has a strong capacity for renewal</li> <li>▪ Allocating funding to key areas of research strength and fostering the diversity of science</li> <li>▪ Supporting: <ul style="list-style-type: none"> <li>– New scientific breakthroughs and innovations via all its funding instruments</li> <li>– An internationally competitive research community that has sufficient critical mass, as well as the key areas of strength for Finnish research, the needs of the innovation system, and Strategic Centres for Science, Technology and Innovation</li> </ul> </li> <li>▪ Developing its Centre of Excellence policy</li> <li>▪ Ensuring that the most promising and talented researchers have access to funding</li> <li>▪ Advancing researchers' career progress, improving research facilities and ensuring that the research community has an appropriate and balanced structure</li> <li>▪ Contributing actively to the drafting and implementation of national research infrastructure policy</li> <li>▪ Focusing long-term research funding and a world-class research input on innovation development</li> </ul> | <ul style="list-style-type: none"> <li>▪ Stepping up its role in debating and influencing science policy</li> <li>▪ Promoting: <ul style="list-style-type: none"> <li>– The practical application in decision-making and in business and industry of the results from research it has funded</li> <li>– The visibility of science and its results</li> <li>– Science education</li> <li>– Open access to scientific datasets and publications</li> </ul> </li> <li>▪ Participating in new science policy discussion forums</li> </ul> | <ul style="list-style-type: none"> <li>▪ Contributing actively to building the European Research Area</li> <li>▪ Funding <ul style="list-style-type: none"> <li>– Research that addresses the grand challenges facing humankind</li> <li>– Research infrastructures</li> </ul> </li> <li>▪ Supporting the international mobility and networking of researchers.</li> <li>▪ Making funding decisions that reflect the potential and ability of researchers to create and develop high-level international research teams and environments.</li> <li>▪ Contributing actively to the drafting and implementation of European research infrastructure policy</li> </ul> |

Source: Academy of Finland

Survey respondents were asked to agree or disagree with statements to about whether the Academy's strategy is in line with the needs of the research communities, industry and society. The results of the surveys are summarised in Figure 6 and show that grant holders are broadly happy that the Academy's strategy meets their needs, while unsuccessful applicants to the Academy are less convinced.

The internationalisation strategy will be addressed in Chapter 5. Key elements include the emphasis on the role of scientific research in resolving Grand Challenges, the contribution to building of the European Research Area and the provision of opportunities for international collaboration.

The current strategy of the Academy is very broad and general. It more or less repeats the mission statement of the Academy without making a clear distinction between the past and the future; or pointing out the areas of strategic importance for the future. It contains only soft statements about how the Academy will achieve its goals. The strategy contains many words like 'supporting', 'promoting', 'advancing', but it lacks specific information about strategic choices or concrete (new) funding schemes for example. No clear choices are made about specific themes or grand challenges either. The strategy

states that the Academy will allocate funding to key areas of research, but it does not indicate what these areas are. This reflects the bottom up approach of the Academy. Researchers generally like such an approach and this might explain the scores of the survey respondents. What seems to be lacking is a vision in which the Academy reflect on the changing national and international environment, the role of the Academy in the science and innovation system and the strengths and weaknesses of the Academy as a funding organisation. This kind of (SWOT) analysis should be the starting point for strategy development. In the future the Academy should adopt a strategy process, which includes analysis of the changing environment and the role and added value of the Academy in the science and innovation system.

## 2.6 Budget

The total budget of the Academy of Finland shows an upward trend (Figure 7) and was €357m in 2011. It is defined here as the allocated research funding plus the administrative costs.

Tekes project funding increased by about 32% from some €480m in 2008 to €633m in 2010. In

Figure 6 Survey respondents' views on the strategy of the Academy

| Statement  | Type of respondent | Agree fully + Agree partly | Neither agree nor disagree | Disagree partly + Disagree fully | Nr. of responses |
|--|--------------------|----------------------------|----------------------------|----------------------------------|------------------|
| The strategies of the Academy are in line with the development needs of the research communities | AS                 | 36%                        | 22%                        | 33%                              | 414              |
|  | GHS                | 57%                        | 18%                        | 13%                              | 395              |
| The strategies of the Academy are in line with the needs of industry                             | AS                 | 16%                        | 23%                        | 19%                              | 412              |
|  | GHS                | 18%                        | 32%                        | 10%                              | 395              |
| The strategies of the Academy are in line with the needs of society                              | AS                 | 40%                        | 27%                        | 19%                              | 413              |
|  |                    | 54%                        | 21%                        | 10%                              | 397              |

Source: Technopolis surveys - grant holders (GHS) and applicants (AS) of the Academy of Finland, Dec 2012

2011 the funding stabilised.<sup>(21)</sup> During the same time period, Academy funding increased from €300m to €350m; representing an increase of 17%. The funding of Tekes is on a substantially higher level (almost twice of the Academy's budget) furthermore Tekes' budget increased much more in the 2008 – 2010 period than the Academy's budget (32% versus 17%).

### 2.6.1 Additional funding for research programmes

While some other funding agencies are able to attract large amount of external funding (funding from other sources than the block grant from the Ministry), the Academy has hardly any additional funding. The total volume of funding from other national funders is only €0.6m per year. The research programmes are the only funding scheme where the Academy is able to attract additional funding. Within the research programmes some 3.6% of the projects are funded by other national sources. The level of additional funding was higher in previous years, but

the Academy has tended to avoid handling others' money as the additional processing increases its administrative costs.

### 2.6.2 Budget of the Research Councils

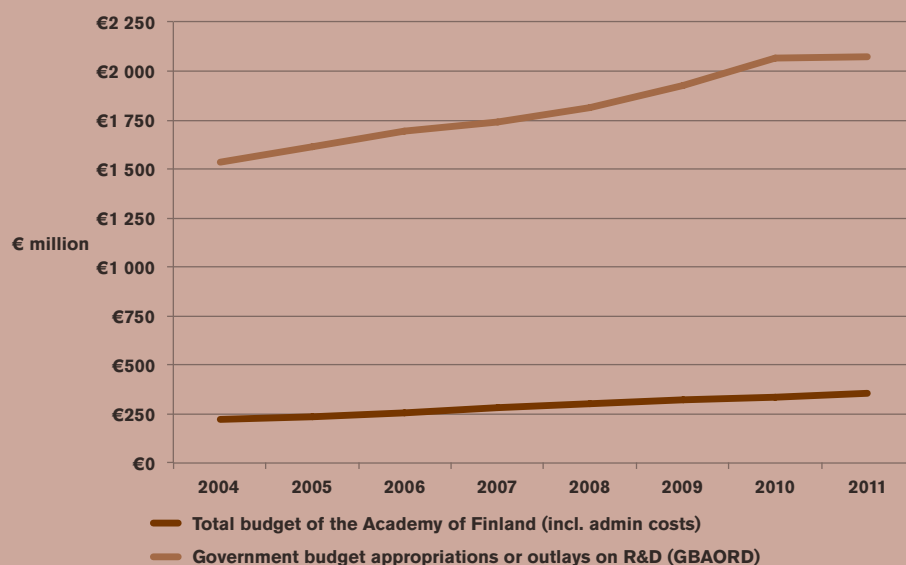
Figure 8 shows the results of the annual research funding decisions between 2004 and 2011 made by the Councils and sub-committees. The largest share of the research funding of the Academy is allocated to the Research Council for Natural Sciences and Engineering. Most fields show a steady increase in budget from 2004 to 2011. The Board's research funding budget remained relatively stable with an average budget of €22m (2009- 2011).<sup>(22)</sup> This is due to the fact that it is the sum of annual fees of large infrastructures like CERN, EMBL, ESO, IASA which are not very volatile.

The councils are obliged to allocate some of their budgets for two funding schemes: post doctoral researcher and Academy Research Fellow. The Board annually sets the 'minimal budgets per funding scheme. There are no constraints for budget alloca-

21 Geert van der Veen, Erik Arnold, Patries Boekholt, Jasper Deuten, Andrej Horvath, Peter Stern and James Stroyan, *Evaluation of Tekes.22/2012*, Helsinki: Ministry of Employment and the Economy, 2012

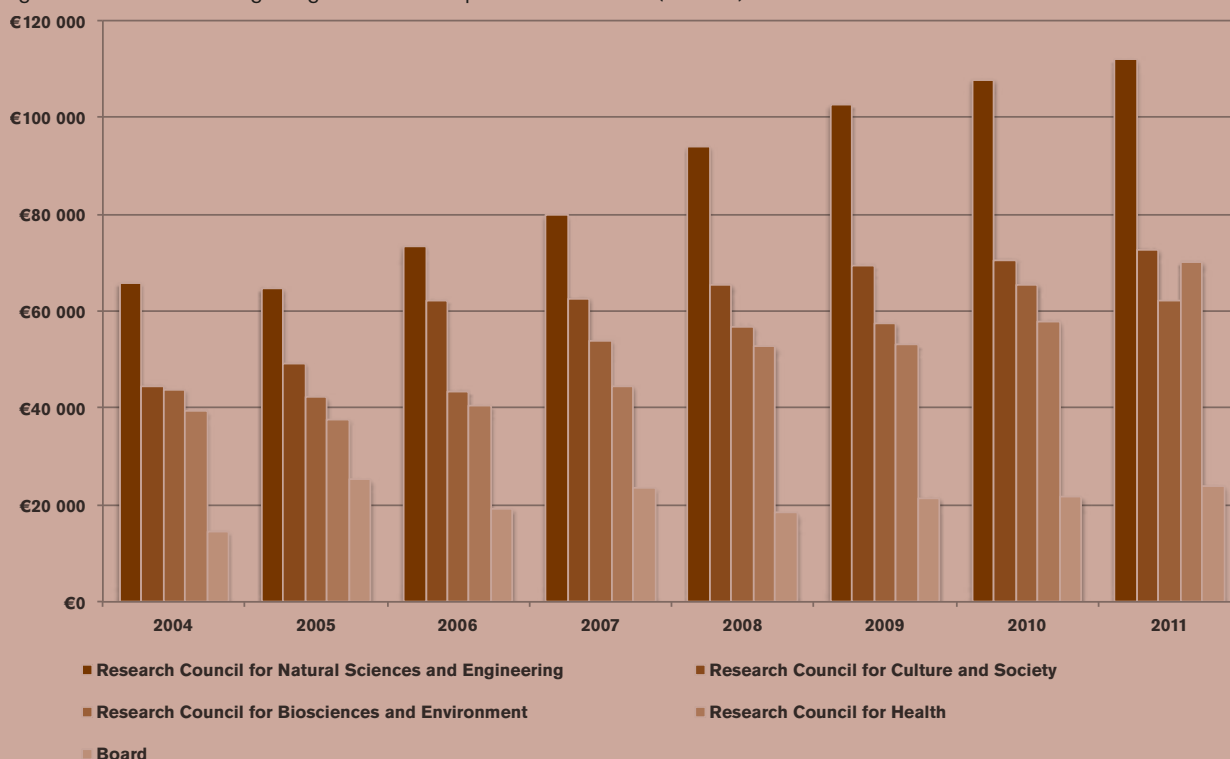
22 The board is the decision-making body for the thematic funding scheme: research programme, infrastructure CoE.

Figure 7 Development of Academy of Finland budget and Finnish GBAORD 2004–2011



Source: Academy of Finland and Eurostat data for GBAORD

Figure 8. Research funding budget 2004-2011 per council domain (x€1000).



Source: Academy of Finland

tion to other funding schemes. That leaves budget for Council's strategic funding. Every council describes very exactly how much and for what purposes they need the 'strategic' money for the coming year.

The Board allocates money for Research Councils' strategic funding based on these plans. In principle, the Board of the Academy could decide to boost funding in certain domains and therefore reallocate budget among the Councils. Figure 9 shows how funding decisions made by sub-committees and councils fell into Councils' domains. The figure shows that there have not been significant changes in shares over time.

### 2.6.3 Views of respondents on budget allocation

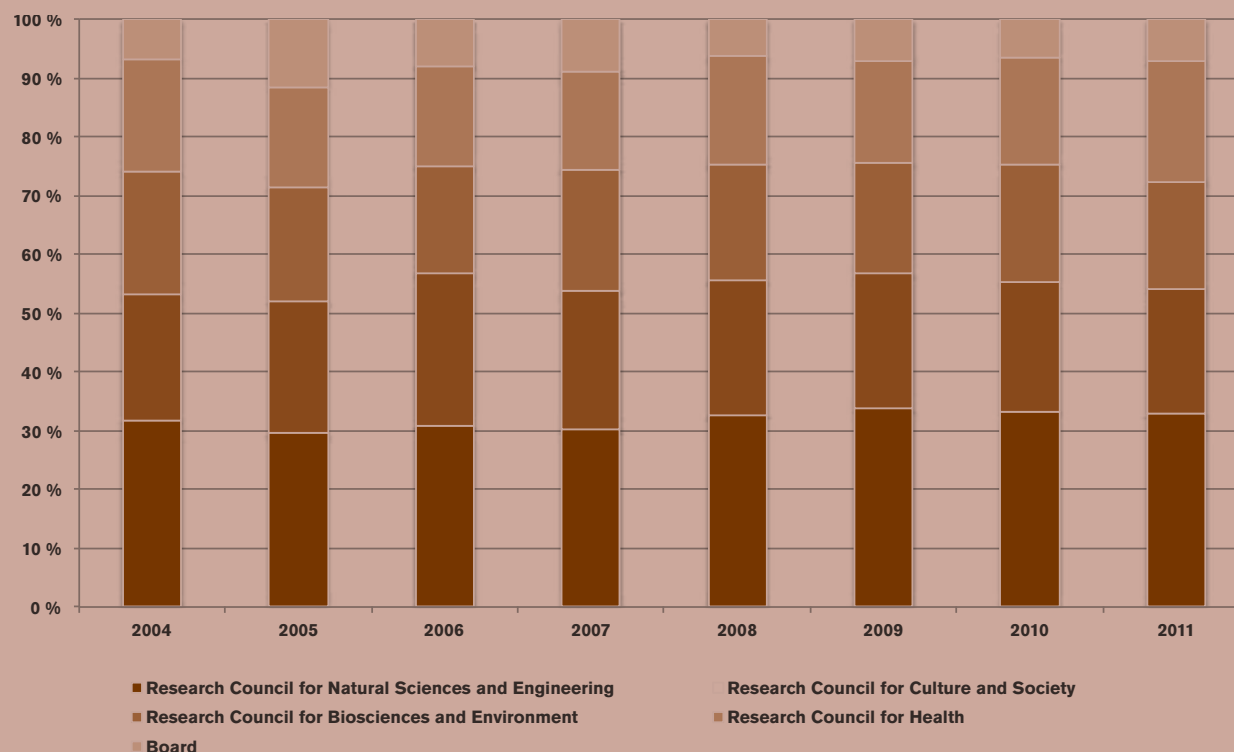
In general, the Academy's Research Councils can decide on about 70% of the budget allocated to the

Academy, while for the part of the money they have to compete with each other (e.g. CoE etc.). Subcommittees decide on this other part.<sup>23</sup> However, even after the competition, the shares per Research Council change little. Interviewees argued that this indicates a lack of more strategic budget allocation and that the role of the heads of the Research Councils on the Board encouraged a budgetary stalemate.

Many respondents, especially researchers, argued that the budget of the Academy is too small. The success rate of some funding schemes (e.g. Academy professors) is extremely low and extra resources are needed to increase the success in this. In general it was stated that the Academy's funding is of crucial importance for researchers and research careers

<sup>23</sup> The Board may transfer a matter pertaining to the scope of activity of two or more Research Councils to be processed and decided by a sub-committee appointed by the Board.

Figure 9 Shares of the research-funding budget 2004-2011 per council domain



Source: Academy of Finland. The Category 'Board' are membership fees.

Figure 10 Overhead of AKA 2004-2011

|                                       | 2007  | 2008  | 2009  | 2010**  | 2011  |
|---------------------------------------|-------|-------|-------|---------|-------|
| <b>Processing costs<br/>(x €1000)</b> | 7,520 | 8,526 | 9,624 | 7,686   | 9,913 |
| <b>% of total budget*</b>             | 3,4%  | 3,1%  | 3,4%  | 2,0%*** | 3,0%  |

\* The total budget is defined here as the allocated research funding plus the administrative costs.

\*\* From the beginning of 2010 Academy Professor and Academy Research Fellow positions as civil service ceased to exist and the persons became employees in the host organisations. All the ongoing grants were changed. During the period when the research posts were positions as civil service, funding decisions of the 5-year terms were estimated values not real in the funding statistics.

\*\*\* Change in liabilities accrued from earned but yet unpaid holiday pays and holiday bonuses of research posts.

Source: Academy of Finland

therefore enough resources should be available to support and enhance Finnish research careers.

## 2.6.4 Administration costs

An indicator of the efficiency of a funding agency is the proportion of the total budget allocated to administrative costs. Administration costs are de-

fined as the costs needed for the operations of the Academy (peer review process, rent, etc.). The table above shows the overall processing costs of the Academy as a percentage of all funding decisions (administrative costs). The share of administrative costs shows a decrease from 2007 to 2011: the percentage of the total budget spend on overhead was 3.4% in 2007 and 3.0 % in 2011 (Figure 10).

Apparently the Academy has been able to work more efficiently over time.

The figure below shows reported administrative costs for a sample of funders in other countries. It indicates that from an international perspective the administration costs of the Academy are very low. If we take 2009 as a benchmark, we see that The Danish National Advanced Technology Foundation has the lowest percentage of administration costs. All the other councils have higher percentages than the Academy of Finland. The tasks of the councils do of course vary. Some are more active in developing thematic programmes with various stakeholders, which can explain a higher percentage of administration costs, so one should be cautious with this kind of comparison. The overall picture is however, that the Academy works in an efficient manner. The shift to funding bigger projects, the grouping of

calls for different schemes (e.g. the use of panels for different schemes) and a mainly bottom up approach could explain the relatively low administration costs.

## 2.7 International comparison

We carried out an international benchmark study. For the benchmark exercise we analysed three foreign research funding organisations: VR (Sweden), FWF (Austria) and NWO (The Netherlands). Their tasks and roles in the national systems, the organisational set-up, the different procedures and processes of these three organisations offer interesting comparisons with the Academy of Finland.

In terms of organisational structure, VR and FWF ensure a close connection to the scientific community. The members of the Board of the

Figure 11 Administrative Costs of Research Funders

| Research Council                               | Share of administrative cost in total expenditure (early 2000's as available) |       | Share of administrative cost in 2011-2012 |      | Data used (annual report)                                      |
|--|---|-------|---|------|--|
| <b>UK</b>                                      |   |       |   |      |  |
| EPSRC  | 2004  | 4%    | 2011                                      | 3.9% | Operating and Staff costs                                      |
| <b>Canada</b>                                  |   |       |   |      |  |
| CIHR   | 2003  | 5.9%  | 2012                                      | 6.3% | Total Operations and Administration                            |
| SSHRC  | 2003  | 5%    | 2011                                      | 3.0% | 2003: Operations<br>2011: Internal Services                    |
| <b>Sweden</b>                                  |   |       |   |      |  |
| VR   | 2001  | 12.5% | 2011                                      | 7%   | Administrative Cost  |
| <b>Netherlands</b>                             |   |       |   |      |  |
| NWO  | 2004  | 6.9%  | 2011                                      | 6.4% | Administrative Cost (2011: Management and other general costs) |
| <b>Denmark</b>                                 |   |       |   |      |  |
| Danish National Advanced Technology Foundation | 2005  | 2.4%  | 2011                                      | 2.0% | 2005: All Secretariat costs<br>2011: Administrative costs      |
| <b>Austria</b>                                 |   |       |   |      |  |
| FWF  | 2008  | 3.4%  | 2012                                      | 3.5% | Administrative expenditure                                     |
| <b>New Zealand</b>                             |   |       |   |      |  |
| HRC  | 2006  | 4.7%  | 2012                                      | 5.0% | Other Operating Expenditure                                    |

Source: Annual Reports



Swedish Research Council are chosen by electors who are nominated by the scientific community/organisations. FWF has an Assembly of Delegates with representatives of Austrian universities, the Austrian Academy of Sciences and various Ministries. The key role of the Assembly of Delegates is to decide on the rules of procedures for the Executive Board, the FWF Board and for the Assembly itself. The Assembly is also in charge of electing the President and the members of the Board. The main principle behind the constitution, role and responsibilities of the Assembly of Delegates is that it allows the science system to govern itself.

NWO has, in addition to the traditional disciplinary based research councils (or divisions), also so called temporary taskforces (e.g. for Genomics) which function more or less as a division/council. These taskforces target a specific domain and combine basic research with activities for the commercialisation of the results of scientific research. The task forces are a way of bridging the world of industry and academia. NWO has members from outside academia in the board of the divisions as well. These bring in an external perspective and facilitate the alignment of NWO's activities more closely with societal needs and societal organisations (like museums, companies, etc.). The strategy of NWO addresses thematic priorities as well. NWO was more or less forced to harmonise the priority areas with the new Industrial Topsector policy of the Government. Although NWO's core business is to support basic research, they apply different means and structures to facilitate interaction with industry and society.

Pressure from the government – applied either through the performance contract of the research council or through the directions set by the government's research policy strategy - affects both the Swedish Research Council and the Austrian Science Fund. In Sweden the government issues bills identifying strategic areas with significant funding attached to enable the advancement of these strategically important scientific fields. In terms of the role of VR in the future the government urges the Research Council to become more strategic and at the same time VR strives to become more proactive in its re-

search funding activities. In Austria the development of research in the different thematic areas overall is the responsibility of the ministries, who have performance contracts with the universities, and have the tools and measures to influence the research directions. The main mission of FWF is to create competition and ensure and bring quality in the Austrian research system. The Science Fund does not develop its activities along thematic lines, as it would be against the Science Fund's working principles.

## 2.8 Conclusions

In this Chapter we addressed the key functions, organisation structure and the budget of the Academy. Regarding the organisational structure of the Academy, Stakeholders in general have a positive view of the Academy staff and most respondents feel that the Academy is run in a very efficient and competent way.

Stakeholders emphasised the importance of the Council members in the organisation of the Academy. Views regarding the composition of the Board were less favourable, and criteria for the selection of the Board members do not seem to be clear to everyone. Further, the composition of the Board hinders renewal and adoption of a more strategic approach. Some of the interviewees claim that the relationship between the Board and the councils is too tight, resulting in stasis.

The view of the evaluators is that the ties between the Councils and the Board should be looser. When for example Board members are independent from the Council there is more freedom for strategic steering (by budget allocation). Further, this would strengthen the checks and balances in the organisation and could reduce work of the Council chairs.

Some respondents criticised about what they saw as a silo structure in the Academy. The current organisational structure with the four Research Councils represents the different disciplines by which the Academy's activities are driven, and is found less favourable for supporting multidisciplinary research and new emerging fields. This might be more a management problem than an organisational problem, but the Academy has to find ways to accommodate

multidisciplinary research and new emerging fields. It is to be noted, however, that the Academy commissioned a study of multi- or interdisciplinary applications and their treatment and found that the acceptance rate for disciplinary and interdisciplinary research proposals was the same: 19 % for the former and 21% for the latter.<sup>(24)</sup> This is an interesting case where popular perceptions are perhaps in contradiction with the reality.

The budget of the Academy shows a steady increase from 2004 to 2011. Nonetheless, many researchers argue that the budget of the Academy is too small. Low success rates and the crucial importance of Academy funding in the Finnish system are the main arguments for this. When looking at the budget allocation among the Councils, we see a stable pattern. There are no major shifts in budget allocation between the Councils over time.

Figures about administration costs indicate that the Academy works efficiently. From an international perspective, the Academy is one of the most efficient funding agencies. The shift to bigger grants, the grouping of calls for different schemes (e.g. the use of panels for different schemes) and the mainly bottom up approach might explain the relatively low administrative costs.

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24 Henrik Bruun, Janne Hukkinen, Katri Huutoniemi, Julie Thompson Klein, *Promoting Interdisciplinary Research: The Case of the Academy of Finland, Publications of the Academy of Finland* 8/05, Edita Oy, Helsinki, Finland 2005

# 3 The role of the Academy in the Finnish research and innovation system

## 3.1 Policy and governance context

Finland has for a long time regarded research and innovation (earlier, technology) policy as an important priority on the government agenda and has aimed to achieve economic growth and societal development through knowledge-intensive industries and activities. After the rapid economic growth in the early 2000s, the country has been faced with declining innovation activities<sup>(25)</sup>, structural change in Finnish industry, transfer of industrial jobs outside the country even in high-tech sectors, changes in the structure and mechanisms of global economy, and emergence of new competitive economies on the global scene. In this situation and in order to be able to maintain its welfare society model, Finland aims to promote new sources of economic growth. R&D&I are seen as significant parts of the new growth economy policy, though other policy sectors are vitally important, too.

An important part of this growth policy aim is to ensure that the Finnish innovation system oper-

ates well. Many of the requirements go beyond research policy<sup>(26)</sup>. With regard to the R&I policy, central aims are to ensure the provision of intellectual capital and its renewal. Further, the creation of high-quality knowledge and knowhow in Finland and its effective transfer to use and applications, and commercialisation are essential tasks<sup>(27)</sup>. To this end, important reforms have been undertaken, such as the university reform, preparations for a renewal of research careers, for the creation and adoption of new instruments and models, including demand and user-orientation in innovation policy, the launching of the Strategic Centres for Science, Technology and Innovation (SHOKs)<sup>(28)</sup>. The reform of the public research institutes and public funding are among the measures aimed at achieving the R&D&I policy targets. A reform of the funding, administration, and degrees of the polytechnics is also under preparation

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25 Evaluation of the Finnish National Innovation System – Full Report, Veugelers et al., Helsinki University Print, 2009: p. 14

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26 Such as promotion of start-ups, promotion of venture funding, regulations and standards, innovations within and effective functioning of the public sector, which include factors such as the ICT solutions.

27 Valtion tutkimuslaitokset ja tutkimusrahoitus: esitys kokonaisuudistukseksi, Valtioneuvoston kanslian julkaisusarja 3/2012.

28 *ibid.*

and expected to become effective as of the beginning of 2014.<sup>29</sup>

The representatives of the most important stakeholders negotiate research and innovation policy in the Research and Innovation Council (RIC).

### 3.2 Recent changes in the Finnish research and innovation system

The most important change of relevance to the Academy is the recent university reform and the new Universities Act, which took effect at the beginning of 2010. The formal status of the universities changed and they became independent legal persons separate from the State either as corporations under public law (public university) or foundations under private law (Foundations Act). The reform brought changes in the governance of the universities, and the universities became the employers of their personnel instead of the state. As part of the reform, the Academy Fellows and Professors funded and previously employed by the Academy became employees of the universities (or research institutes) where they work. Even though universities are in principle financially independent and have power over their estates and facilities, they continue to be dependent on the Ministry of Education and Culture (MEC) for their basic funding. They are, however, expected to create strategies for and be selective in developing their activities, such as the creation or strengthening of research and teaching profiles. There are expectations that the Academy can support this process.

Since 2008, the Academy selected the graduate schools and the MEC allocated funding by earmarking the respective sum in the budgets of universities (though the decision of the Academy was not legally binding for the Ministry). The universities selected the students. The funding was about 50 million euro a year of the 1,6 billion euro a year total funding from MEC to the universities. In the case of a national school, funding was allocated to the

coordinating university, which then shared it with the partner universities according to the number of students in the school in a given university. The graduate school system, however, represented less than 10% of the doctoral student population. With the university reform the system was changed and the mandate of the Academy to select schools cancelled.<sup>30</sup> The money for the doctoral programmes is no longer earmarked and it is part of the overall budget of the universities. The aim was to enable all doctoral students to have the same rights and responsibilities and to make the student admission system predictable and transparent.

Since the beginning of 2009, the Academy has applied a full economic cost (FEC) model in the calculation of project expenses. Universities and research institutes are also expected to use the full cost model in their accounting systems. Initially the Academy funded up to 80% of FEC, declining to 70% from the Autumn of 2012.

Another important question concerns the implementation of a four-step researcher career model in Finland<sup>31</sup> in which the Academy has an important role. The Academy funds research careers through its researcher positions – Postdoctoral Researchers, Academy Research Fellows, and Academy Professors – and through support to PhD training in project grants. There has been some change in the emphasis put on supporting the post-doctoral phase as contrasted with the PhD stage evident in the selection criteria of research grants and in the emphasis on the selection of more junior researchers for Academy Research Fellow positions. These changes have created some discontinuities in researcher careers, creating a gap between the Academy Fellow and Academy professor. Even though the purpose is not to create an Academy career outside the university career system, the junior researchers who have not got a university position may find themselves in a difficult situation with non-renewable Academy po-

29 [http://www.minedu.fi/OPM/Koulutus/ammattikorkeakoulutus/ammattikorkeakoulu\\_uudistus/aineistot/?lang=fi](http://www.minedu.fi/OPM/Koulutus/ammattikorkeakoulutus/ammattikorkeakoulu_uudistus/aineistot/?lang=fi)

30 Letter from the MEC to the Academy of Finland, 11.06.2012, about the cancellation of the decision to transfer decision-making on graduate schools to the Academy, OKM/35/592/2012.

31 Neliportainen tutkijanura. Opetusministeriön työryhmämuistioita ja selvityksiä 2008: 15.

sitions and the new Academy rules concerning the submission of only one application at a time.<sup>32</sup>

The context for this change is a decision to adopt a tenure track system in the universities over time. Aalto University is the most advanced here, largely thanks to the extra resources – 80 million euro – it has and will obtain annually for a few years to implement changes in connection with its organisational change. It has allocated 200 positions to a tenure track system since 2010, so far filling just over half of them. As Aalto faculty members pointed out to us, the requirements of the tenure track include teaching and are therefore incompatible with pursuing a 100% research career.

The Academy itself is expected to be a more independent science policy actor<sup>33</sup>. The law on the Academy changed in 2009 and the most important changes included the strengthening of the role of the Academy as a science policy organisation and the position of the board of the Academy in the strategic management of the Academy. Each Research Council Chair is a member of the Academy Board. In the reform the number of the members of the Academy Board that are external to the Research Councils was increased and the Chair of the Board was to be selected among the external members. These changes were made to strengthen the possibilities for the Academy to adopt a more active role in the creation of Finnish science policy (independent of the interests of the individual Research Councils).

The Academy – or its then Director-General, together with the Director-General of Tekes – was actively engaged in promoting the Strategic Centres for Science, Technology and Innovation (SHOKs). These were established in 2007 as public-private partnerships and have become one of the main instruments of Finnish innovation policy in the past five years. The SHOKs are independent legal enti-

ties, non-profit limited companies, which prepare their strategic research agendas and implement research programmes. They are expected to contribute to many goals, to commit resources in the long term to strategically selected, high-quality international-level clusters, anticipate the needs of society and business life with a time-span of 5-10 years, and with high-quality expertise attract innovative companies, global market leaders and international top-level experts to Finland<sup>34</sup>. Currently there are six SHOKs in operation (in metals and engineering, environment and energy, health and well-being, ICT and digital services, built environment, and bioeconomy, former forest cluster). By October 2012 the total volume of SHOK activities, according to their own report, was 813 million euro. On average 37% of the volume was funded by industry, 53% by Tekes, and 10% by the universities and research institutes<sup>35</sup>. The Academy has launched two special SHOK calls. In 2012, the Academy's call prepared together with the SHOKs awarded a total of 8 million euro for projects. In addition, the Academy funded projects in areas related to SHOKs with 23 million euro.

In other countries, similar arrangements – often described as ‘competence centres’ have run with great success. Originating with the US National Science Foundation's Engineering Research Centres programme in the mid-1980s, they involve consortia of industry and academics doing collaborative research over long periods of up to 14 years, integrating PhD education and producing very significant impacts in both industry and the participating universities<sup>36</sup>. Typically, competence centres involve a high degree of subsidy – normally about

32 The annual number of doctoral degrees more than doubled in Finland during the 1990s, and the growth has continued in the early years of the 21st century. In 2008 there were 1,523 new doctorate degrees. Women represented 54,5% of the doctorates in 2008, whereas in the early 1990s the corresponding figure was 33%. See [www.research.fi](http://www.research.fi).

33 Hallituksen esitys eduskunnalle laiksi Suomen Akatemiasta. HE 27/2009.

34 “Licence to SHOK?” External Evaluation of the Strategic Centres for Science, Technology and Innovation, Publications of the Ministry of Employment and the Economy, 1/2013.

35 “Licence to SHOK?” External Evaluation of the Strategic Centres for Science, Technology and Innovation, Publications of the Ministry of Employment and the Economy, 1/2013.

36 Peter Stern, Erik Arnold, Malin Carlberg, Tobias Fridholm, Cristina Rosemberg and Miriam Terrell, *Long Term Industrial Impacts of the Swedish Competence Centres*, VA 2013:10, Stockholm: VINNOVA, 2013

two thirds of the cost is borne by the state through an innovation agency and the rest by industry. This makes it possible to integrate more fundamental or 'strategic basic' research than is otherwise possible in industrial collaboration. Involving academics as well as industry in the design and governance of competence centres is crucial – there is a delicate balance of power between industry's tendency to look for short-term work and academia's interests in the fundamental. The Finnish SHOK design has not taken this into account. As a result, the industrial dominance of the centres has led to a short-term focus, making it unattractive to the Academy to provide complementary funding. It has done so only under some pressure from its parent Ministry.

The government research institutes have been the object of a special study for Finland's Research and Innovation Council, delivered in September 2012, which argues that their current orientation towards individual sector ministry interests is out of date in the context of global challenges and that they should be reorganised into larger entities and the interdisciplinary and multidisciplinary nature of research conducted in such institutes be strengthened. A few should be merged with universities. The rest should have access to strategic research funding, some of it disconnected from their 'sector' missions, in order both to improve or maintain quality and to encourage them to do longer-term research than is needed to satisfy the short-term needs of their sector masters.<sup>37</sup> This proposal is consistent with the wider Finnish research and innovation policy trend in recent years, reducing the emphasis on specific technologies and technology programmes in favour of more broadly defined missions and societal challenges.

The group recommended taking 30 million euros from the research institutes' budgets and allocating it to a programme of research to satisfy government needs, which the cabinet office would manage. It also proposed establishing a funding instrument

for strategically targeted research in 2014, to be located at a new council within the Academy of Finland. Members of the council will be selected from among established researchers and research experts, representing end users of research and possessing experience of extensive change management within the research sector. The expert group further recommended that the funds available for strategic research funding in 2016 amount to 200 million euros. The funding would be collected in stages between 2014–2016, from the state research institutes' research appropriations (120 million euros), from the Academy of Finland's programme-based research funding (20 million euros) and from the Finnish Funding Agency for Technology and Innovation Tekes' innovation and research funding (60 million euros).

The suggested reform is very radical, and if implemented, would imply a great change within the Academy in terms of developing new procedures of proposal evaluation, a more direct interaction with various Ministries and the Cabinet Office about research needs, development of research programmes more directly oriented to societal and political information needs, to mention a few of the aspects that would require substantial reform in the ways in which the Academy operates. One of the reasons to give the strategic funding instrument to the Academy is obviously a wish to guarantee a transparent and competent procedure for project selection and to make sure that there will be a translation of politically/societally important topics into research themes. At the time of writing this report, the government had not yet decided on the direction and extent of the reform.

The suggested strategic funding instrument would require the development of new types of processes within the Academy to satisfy both the scientific level of the research activities while, at the same time, the strategic relevance of the research projects to be funded. Here an ex-post classification of projects into broad challenge areas would not be a sufficient guarantee of relevance. The suggested reform would create an organisation parallel with the more traditional basic research funding function of the Academy. The two processes will be different and

37 Timo Lankinen, Christine Hagström-Näse and Sixten Korkman, *Valtion tutkimuslaitokset ja tutkimusrahoitus: esitys kokonaisuudistukseksi*, Valtioneuvoston kanslian julkaisusarja 3/2012, Helsinki: Tutkimus- ja Innovaationeuvosto, 2012



need to be kept separate. However, it is important that they be transparent, there are clear rules and procedures that are used, and the quality of activities need to be an important criterion in both.

### **3.3 The Academy's role in the Finnish R&I system**

#### **3.3.1 Complementarity of funding and functions**

The Academy of Finland and Tekes are the central public funding agencies for research; the Academy has a role in funding 'basic' research and Tekes in applied research and technological development. Universities are the major beneficiaries of the funding of the Academy (79,6% in 2011).<sup>38</sup> The Academy of Finland is an important source of external funding for government research institutes, too, and in particular, in their collaborative projects with university researchers. The position of the Academy as the major funder of basic research is significant in Finland (with a budget of around 320 M€). Tekes has a much larger budget (550 M€).

Over the last few years, Tekes has been reorientating its traditional 'technology programme' funding. Part of this money has been allocated to the SHOKs. It appears to have reduced its funding of applied research in the universities and institute system, the topics of which are not predetermined or linked to specific programmes or company needs, thus opening up a gap between its increasingly company-orientated funding and the basic research funded by the Academy.

The funding gap between Tekes and the Academy involves strategic and use-inspired basic research (Pasteur's Quadrant<sup>39</sup>). There is no specific funding instrument or arrangement to cater to this important type of research, although in the nature of things some of the work funded by the Academy will fall into this category.

The recommendations of the government research institute working group, among others, suggested that the Academy is facing renewed requirements to respond to expectations concerning responding to socio-economic challenges and needs to develop procedures for the evaluation of societally relevant research proposals. The research programmes of the Academy have traditionally been more research than relevance-focused, though both the development of a research area, sometimes interdisciplinary by nature, and the provision of societally relevant knowledge have played a role in the selection of areas for programmatic support.

Taking into account that Tekes funds industrially oriented research, Finland lacks a coordination and strategic level funding tool to cover societal issues and the societal dimension of Grand Challenges. To some extent, such research needs are addressed, albeit in a fragmented form, in governmental research institutes, which are under different ministries and do not have any overall strategic coordination. The suggested reform of the governmental research institutes does not address this coordination function. Further, both the Academy and Tekes currently lack capabilities and expertise to fulfil the need for such a strategic council.

Non-profit foundations grant annually a significant amount of funds to science (250 M€) and are important funders of research projects, PhD theses, and a few other purposes, but their grants are normally quite small which limits their impact. However, they complement the public funders in providing support to items that the public funding agencies neglect. For instance, after the Academy discontinued its long-standing grant that effectively provided a sabbatical for university professors, [senior scientist's research grant], the foundations together collected a pot of money which can be used for this purpose. However, the grants cover less than half of the professor's salary during the sabbatical, to free them from teaching obligations, with the rest of the salary coming from the university. This new system is very recent so it is not yet clear how well it functions.

The Academy has in recent years transferred smaller funding instruments to the Federation of Finnish Learned Societies which then allocates them:

38 Data from the Academy of Finland, see also Chapter 4.

39 Donald E. Stokes. 1997. *Pasteur's Quadrant – Basic Science and Technological Innovation*. Brookings Institution Press, Washington, D.C.

the state subsidy to scientific/learned societies (especially to publishing activities and membership fees for international scientific and scholarly associations) in 2005 and the state subsidy for organizing international conferences and national seminars in 2008. The Academy awards in all 1,94 million euro to the Federation for both support forms.

### 3.3.2 Cooperation with other stakeholders (e.g. Tekes)

The Academy of Finland and Tekes have collaborative relations and have in the past launched parallel, but complementary research programmes. Currently, they cooperate in the implementation of the FiDiPro programme, implement international calls for proposals with specific countries, and together with Sitra are involved in foresight processes as part of the preparations of the Finnish Government's Foresight 2030 project. Their previous foresight exercise took place in 2009. The Academy and Tekes are involved in many EU-level committees and initiatives, and have a small staff exchange scheme.

Because of their respective modes of action, different project selection processes, and to a large extent divergent target populations their activities are complementary, not overlapping. However, the different modes of activity of Tekes and the Academy can pose challenges for coordination of activities.<sup>40</sup> For instance, both organisations (or their Directors General) were active in the initiation and planning of the Strategic Centres for Science, Technology and Innovation (SHOKs), but their later involvement has greatly differed. The Academy has been less involved in the implementation of calls and funding for the SHOKs, which prepare and select projects and submit a whole programme to funding agencies. In contrast, the Academy operates using rigorous peer review of individual project proposals. However, as indicated by the recent evalu-

ation report of the SHOKs<sup>41</sup>, most of the SHOK programmes involve fairly short term and predominantly industrial research and they have involved few academic researchers (with some excellent exceptions). The nature of the programmes and the mode of operations of the Academy explain the low level of involvement of the Academy. Further, Academy-funded projects in areas related to the SHOKs have not been closely networked with the rest of the programmes. As suggested by the evaluation report, the SHOKs and their programming processes would need to be redefined for them to achieve their ambitious goals in terms of high-level research and attracting top-level experts to them. After such a change there would be better opportunities for the Academy to be more intensively involved and apply its peer review processes to assess the quality of the proposals. Government decisions on revising the SHOKs are expected in the autumn of 2013.

### 3.3.3 Relation with universities and research institutes

After the university reform and the transfer to the full cost model, universities and research institutes need at different levels to be actively involved in researchers' decisions to submit applications. Universities and research institutes have to be committed to providing the basic infrastructure for the proposed research projects and this is reflected in the overhead charges. Some funding forms such as Centres of Excellence involve specific negotiation and agreements between the Academy and the host institute about the provision of resources for the activities funded. The need to be committed to the support of the activities and to employ the personnel of the Academy-funded projects offers an opportunity for universities or research institutes to make choices and focus their research activities with Academy funding. The role of the Academy in this process is to evaluate the proposals and applicants and to guarantee that the best candidates will obtain

40 International Evaluation of the Academy of Finland. Publications of the Ministry of Education, Finland 2004:16.

41 "Licence to SHOK?" External Evaluation of the Strategic Centres for Science, Technology and Innovation, Publications of the Ministry of Employment and the Economy, 1/2013.

the funding. In this way, the Academy is enhancing policy focus or profiling in high-level research activities at universities and research institutes, as was expected in the reform. The extent to which this in fact happens is not yet known, though there is some anecdotal evidence that it is starting to take place.

Universities and research institutes are central in terms of how the new rules and changes are interpreted and implemented. Thus, for example, each university, and within the universities, even schools or faculties, can have different overhead rates, which create extra administrative work for coordinators of collaborative projects. More important, however, there are claims that not all universities give back enough of the overhead money to the department or research group level causing economic loss to them and thus making Academy funding less attractive.<sup>42</sup> Researchers in general experience that there is less money available for actual research than before, though in principle, the new system should be cost-neutral. Whether and the degree to which this experience is related to the way in which universities allocate overhead costs to the different levels of the organisation is not clear.

The transfer of graduate schools (as of 2009, called doctoral programmes) decisions to the universities is too recent for any assessment of the impacts of the change. It is to be noted that the selection of doctoral programmes is not only a question about the quality of applications but also about a consideration of the need for specialists in specific fields in the society. Currently, a body does not exist that would consider or review the overall profiles and plans of the universities including the need for doctoral programmes. Thus, there is potentially a need for overall coordination of the system, which is to some extent neglected in the present system of mutual competition and profiling by the universities. The former Council for Higher Education had such a task. It is conceivable that the Academy of Finland could be delegated such a task in specific areas, in-

cluding consideration of the need for and selection of doctoral programmes.

In the area of research infrastructure, the Academy has been given a national coordinating role. It has appointed a broad-based national expert group for research infrastructures (the FIRI Committee) with the task of updating the national roadmap for research infrastructures in 2013. Another task of the FIRI Committee is to evaluate the urgency of the projects and to make proposals for prioritisation, implementation and funding.

The suggestions of the expert group concerning the reform of the government research institutes would create a closer relationship between them and the Academy. If the suggested reforms will be implemented, the government research institutes will have to compete for Academy funds to a very large extent. The expert group report suggested the creation of a new funding instrument in the Academy, a strategic funding instrument, which would probably be the most important external funding source for these institutes, provided the suggestions be implemented. The research institutes would have to continue to compete also for the current – traditional – type of funds of the Academy. In any case, the links between the Academy and the government research institutes would need to become much closer than they are currently.

### 3.3.4 Relationship with the Ministry of Education and Culture

The Academy is steered by the Ministry of Education and Culture (MEC) through performance steering, which entails four-year agreements and minor changes in the intervening years. This gives the Ministry an opportunity to have broad influence on the activities of the Academy and link budgetary resources to specific lines of activities. However, the Ministry does not seem to attempt strong steering. Furthermore, the steering of the Academy is not a simple matter since the Academy has four fairly independent Research Councils and the Board consists of eight members including the four Research Council chairs.

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<sup>42</sup> Cf. the report “Yhtenäiseen kokonaiskustannusmalliin: STREAM-työryhmän raportti”, 31.3.2011, Suomen Akatemia 2011 on the full cost model

The 2011-12 performance agreement is largely couched in general terms: the Academy should enhance research quality; develop research careers; increase cooperation with the Ministry and Universities; implement a national research infrastructure policy; and reinforce the status and visibility of research. There are a number of more specific instructions

- Increase the scale but not the number of Centres of Excellence
- Provide funding support to the SHOKs
- Develop research careers and training through PhD programmes
- Prioritise post-doctoral researchers for funding
- Arrange a science competition (Viksu)
- Produce a new review of the state and quality of scientific research in Finland

There are then a series of specific budgetary targets and targets for administrative efficiency.

In addition to the formal steering process, there is frequent informal interaction between the key people at the Academy and the Ministry providing a route for exchange of views and the expectations concerning the performance of the Academy. The President of the Academy of Finland is an ex officio member of the RIC and there is thus mutual interaction among these institutions.

Though overall good, the relationship between the Academy and the Ministry is not without tension. The steering relationship between ministries and research councils is conventionally discussed in principal-agent terms<sup>43</sup>. Principal-agent theory applies where an actor (normally an economic actor) needs to have something done but lacks the knowledge or resources needed and therefore engages an agent to do it. In the narrow perspective of economics, the principal-agent relationship arises because of ‘information asymmetry’: the

agent knows things that the principal does not. As a result, the principal is faced with the possibility of ‘moral hazard’ – the agent may act in her own interests, not in the interests of the principal – and ‘adverse selection’ – the agent may choose to do the wrong thing, as when a research council does not choose the best projects to fund. Evaluation is one way to test for, and to discourage, these behaviours. While there certainly has been tension about the role of the Academy in implementing the SHOKs, we see no substantial evidence of moral hazard.

Organisations like the Academy involve a special case of principal-agent relationships where there are three interacting levels. At the top, the ministry acts as principal to the research council, giving it instructions and money to use in following those instructions. However, the research council in turn spends the money on projects, where it is the principal and researchers the agents. In principal-agent terms, the Academy is an intermediary whereby the Ministry is its principal and the research community its agents. Intermediary organisations are specific in that even though they define their institutional goals, these are shaped and influenced by the actors between which they mediate, the national governments, and especially the “ministries responsible for science” and the scientists. At the same time, the Academy, like Research Council type of organisations in general, draw on the expertise of the research community through peer review, panel and planning processes and are influenced by the way these interpret the expectations of the principal (or principals). A key risk for intermediary organisations is that they become locked in as a result of having to secure the cooperation of the beneficiaries.<sup>44</sup> This quandary is illustrated by the stability of the funding allocations among the Academy’s research councils and the slow rate of change in the tasks the Academy has performed over the years, contributing to creating the ‘funding gap’ between the Academy and

43 Arie Rip and Barend van der Meulen, ‘Science policies as principal-agent games: institutionalisation and path-dependency in the relation between government and science’, *Research Policy*, 27, 1998; Dietmar Braun and David H Guston, ‘Principal-agent theory and research policy: an introduction’, *Science and Public Policy*, 30 (5), 2003; Elizabeth Shove, ‘Principals, agents and research programmes’, *Science and Public Policy*, 30 (5), 2003, 371-382

44 Dietmar Braun, ‘Who governs intermediary agencies? Principal-agent relations in research policymaking’, *Journal of Public Policy*, 13 (2), 1993, pp135 – 162T. Luukkonen, Study of National Research Councils: The Impact of the ERC on National Funding Bodies. 2012. <http://www.eurecia-erc.net/resource-centre/official-documents/>

Tekes. Similar effects were visible at the Austrian Research Council (FWF) and the then innovation agency (FFF) in 2004. Governed by their respective beneficiaries (the research community and industry) they failed to adjust to external change – something that in the case of FFF was a key reason for merging it with other organisations to create the current Austrian innovation agency FFG.<sup>45</sup>

Even though the Ministry appreciates the quality of the processes of the Academy, it would rather see it as an agent and implementer of its policies than reflecting the views of the research community. There is thus a tension between these two roles of the Academy. One of the issues in which this tension is evident concerns the role of the Academy in the funding of the SHOKs where MEC wanted the Academy to play a greater role than it actually did. It is to be seen whether the impacts of the SHOK evaluation will change the implementation of the SHOK concept sufficiently to ease this tension. More generally, the question boils down to the responsiveness of the Academy in the promotion of relevant, in addition to excellent, research.

The delegation styles used between ministries and research councils have evolved over time. ‘Blind delegation’, where the decisions about how to use the money are simply left to the council worked in many places until the 1970s, when the ‘social contract’ with science started to change and state became much more interested in understanding the results of research and ensuring they were economically and socially useful. From that point, ministries have increasingly tried to govern science using incentives and performance contracts, the latter in line with current thinking on the so-called ‘New Public

Management’<sup>46</sup>. However, effective governance appears to require a degree of decentralisation and use of local as well as central strategic intelligence. Effective governance styles rely increasingly on a degree of empowerment – giving the agent sufficient freedom to innovate and to invest in a class of solutions rather than individual potential solutions<sup>47</sup>. This allows agents to learn and add value to the instructions of the principal through programming. Correspondingly, if the agent is not empowered it is difficult for it to innovate and quickly shift resources to support emerging ideas and risky research or to maintain sufficient diversity in the system to respond to emerging problems. Empowerment relies in turn on trust and a level of shared values and social ties.<sup>48</sup> The risk of moral hazard and adverse selection is expected to reduce where these contextual factors are in place. MEC’s ‘soft steering’ of the Academy through regular dialogue helps to secure these ‘contextual factors’. In our discussion of the Academy’s advisory role we suggest that a greater combined effort in strategic intelligence across the two organisations would improve performance. It would be likely also to improve the steering process by reducing information asymmetries and giving both parties a better understanding of science policy needs.

### 3.3.5 The Academy as a policy advisor

Another area where there is some tension concerns the role of the Academy as an expert in policy advice. Combining the roles of research funding and providing strategic advice in a single organisation can also prove tricky. The history of trying to do this in Norway has resulted in the advice-giving

<sup>45</sup> Erik Arnold, Martin Wörter, Michael Dinges, Nikolaus Gretzmacher, Wolfgang Polt, Andreas Schibany, Gerhard Streicher, Klaus Zinöcker, Erik Arnold, Patries Boekholt, Leonhard Joerg, Fritz Ohler, Shonie McKibbin, Geert van der Veen, Shaun Whitehouse, Barend van der Meulen, Martin Falk, Rahel Falk, Norbert Knoll, Hannes Leo, Gerhard Schwarz, *Evaluation of the Austrian Industrial Research Promotion Fund (FFF) and the Austrian Science Fund (FWF)*, Brighton: Technopolis, 2004

<sup>46</sup> Dietmar Braun, ‘Lasting tensions in research policy-making – a delegation problem’, *Science and Public Policy*, 30 (5), 2003, 309-322

<sup>47</sup> Elizabeth Shove, ‘Principals, agents and research programmes’, *Science and Public Policy* 30 (5), 2003, 371-381

<sup>48</sup> Benedetto Lepori, ‘Coordination modes in public funding systems’, *Research Policy*, 40 (3), 2011, 355-367



function losing credibility and gradually being eroded over time<sup>49</sup>.

The Chair of the Board of the Academy is an ex officio member of the RIC and in this capacity brings the expertise of both himself and that of the organisation to the highest level of policy preparation. The various informal contacts between the Academy officials and those of the Ministry and other organs of the government are a case in point. Further, the evaluation reports of research fields and the reports of the State of Scientific Research in Finland, the latest published in 2012<sup>50</sup>, provide useful data on the quality of Finnish research and the research system, and are highly valued.

The advisory role of the Academy is not, however, well developed; nor does the Academy have a clear mandate for giving advice beyond publishing the ‘state of scientific research’ reports. For example, the extent to which it should move beyond narrowly-defined science policy and towards its integration with wider policies for innovation and the resolution of societal challenges is not defined.

On our analysis, there are significant opportunities for the Academy to play a more active role in giving advice – some of which it is already beginning to take. It could

- More actively understand and describe the areas of strength and weakness in Finnish science, through bibliometrics and the tradition of peer-based field reviews as well as periodic foresight exercises at the level of fields, disciplines or problem areas
- Link this understanding with its growing interactions with the universities, to help them consider their internal specialisation strategies
- Have an open debate with the Ministry and others about where programmatic actions are needed to support weak areas or exploit new scientific opportunities
- Make specific proposals to the Ministry and the RIC about opportunities for concerted action
  - With other national funders, primarily Tekes
  - In the context of the increasingly important ERA instruments such as Joint Programming Initiatives
- Develop and propose national strategies for research infrastructure, doctoral programmes, international cooperation and other aspects of science policy that transcend the interests of individual research-performing institutions

The Academy has the opportunity to make greater use of the expertise of the scientific community in developing such advice.

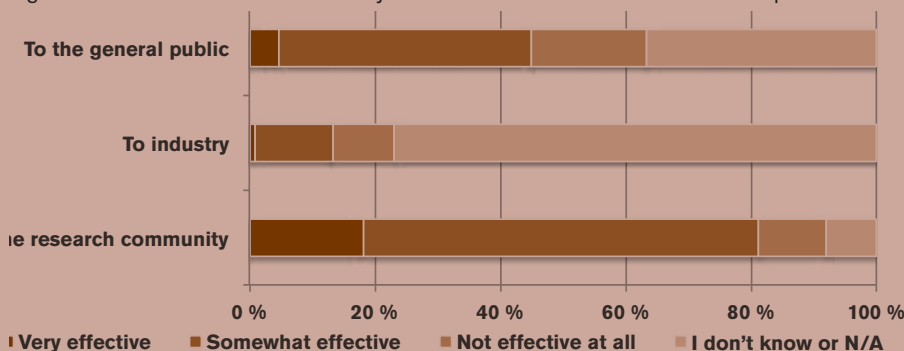
### 3.3.6 Science communications

Views, regarding the extent to which science communication is a task of the Academy or more the responsibility of its grant holders, seem to differ among stakeholders. However, all agree on the im-

49 Erik Arnold and Bea Mahieu, *A Good Council? Evaluation of the Research Council of Norway*, Oslo: Ministry of Education and Research, 2012

50 The State of Scientific Research in Finland 2012, ed. by Leena Treuthardt and Anu Nuutinen, Publications of the Academy of Finland 7/12.

Figure 12 How well does the Academy communicate about its work and the impacts of its funding?



Note: the number of responses varies by sub-question between 776 and 779

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012



portance of science communication. The Academy carries out a broad range of activities to foster dissemination and discussion on science in general and more specifically on research activities and results. Examples of dissemination activities of the Academy include article collections, organisation of events, both for specific and broader audiences (e.g. media breakfasts and a science gala) or publications for the general public.

As the results of the two online surveys show (Figure 12), researchers believe there is room for improvement regarding the Academy's communication to different stakeholder groups. Although the Academy's communication to the research community is regarded very effective or effective by most of the survey respondents (over 80%), communication to the general public and to industry could be much improved. Interviewees also added that the Academy should target politicians with its science communication activities. Stakeholders mentioned some ideas how to improve the Academy's activities regarding science communication, for example

- Increasing the prestige of the various events and prizes awarded
- Making science more popular by changing the perceptions of science in the wider society
- Creating greater visibility for the Academy in the media through increased focus on outreach activities

Outreach and science communication is of course a joint responsibility of the Academy and many other organisations, especially universities and research institutes. According to many stakeholders, the Academy should play a more prominent role at a national level. For example, it could coordinate joint national campaigns. NWO in the Netherlands for example plays a much more active role in this field as do a number of other research councils internationally.

The Dutch Research Council, NWO, conducts a number of activities in the field of science communication. The most prominent are:

- **The National Science Quiz (senior and junior):** a national science quiz published in a number of newspapers and online. The quiz is also broadcasted on the national television.

- **'Bessensap':** a one day meeting with science communication people from universities, research institutes and journalists.
- **Eureka prizes:** annual prize from NWO and the Royal Dutch Academy (KNAW) for researchers and journalist who bring science to a broad public.
- **Workshop science communication:** NWO organises every year a training course for scientists on science communication.
- **Question mark:** scientists funded by NWO are answering questions posed by the broad public in one of the free newspapers in the Netherlands.
- **Publications:** all kind of publications about the results of the science NWO funds, such as Scientific research in the Netherlands, Experiment NL and a annual report for the broad public.

The mission statement of the Academy is not very precise regarding science communication. On its website the Academy states: "One of our aims is to actively promote public awareness and understanding of science and research." In our view the Academy should not be leading in science communication in Finland. There is neither a clear assignment nor a budget for this kind of task. The Academy nonetheless has a role and responsibility in science communication. Science communications could be used for different means (such as encouraging people to take up scientific careers, awareness, accountability, etc) and the main goal for the Academy should be dissemination of the results of scientific research supported by the Academy to a wider audience.

### 3.4 Stakeholder comments on the role of the Academy in a systems perspective

Stakeholders regard the role of the Academy as a funder of basic, independent and high-quality research as fundamental for the Finnish system, and its impact is considered immense. It has a role in the maintenance of quality control in the Finnish

research system. The Academy has transparent selection systems. Even though foundations fund basic research they are typically seen as funders of junior researchers for a short time period, often in the final phase of PhD thesis preparation.

The roles of the Academy and Tekes are seen as complementary and their division of labour is considered clear. The resources of the Academy are, however, seen as too small, especially as compared with those of Tekes. The two funding organisations do not collaborate much in practice through, e.g., joint programmes.

Researchers and other stakeholders would like to see the Academy acting as a stronger spokesperson for science. It is felt that the government does not understand sufficiently the importance of basic research as a strong component in innovation policy and therefore, more efforts are needed to remedy the situation. The MEC in particular was criticised for not defending the position of basic research and the autonomy of universities strongly enough.

Interviewees from the government research institute sector found the ministry silos a problem. The Academy is under the MEC while most of the government research institutes are under other ministries. This creates a situation in which researchers from these institutes feel that they cannot apply for all funding forms. This applies, especially, to the infrastructure funding in which the Academy has a special role.

The Academy's funding decisions are in practice seen to affect universities and their strategies. Especially research programmes promote cooperation and alignment of research directions of different institutions. The relationship between the Academy and the universities is generally considered good.

The majority of the stakeholders are concerned about the change in policy concerning the graduate schools, currently called doctoral programmes. It was not clear for the stakeholders what this change entails. There are also fears that this could result in 1) fewer national-level programmes and less coordination and collaboration between programmes of different universities; 2) a lower quality of programmes and students because of less competition within a university compared with a national level

recruitment base; 3) less money effectively to be allocated to the programmes, since this money was not earmarked for this purpose in university budgets and under the circumstances of funding cuts, it may turn out to be attractive to use the money for other purposes; 4) small disciplines, which have greatly benefited from a national-level graduate school, might suffer in terms of student places and resources since they are placed within broader-based doctoral programmes in their faculties.

SHOKs prompted quite critical assessments from interviewees. They believed the SHOKs have design problems such as the fact that competing companies are not willing to bring their strategic research projects to a joint programme. Further, they felt that the companies involved in SHOK activities do not bring novel ideas to the SHOKs to avoid their spread to their competitors and do not promote new environments for business. SHOK research is driven by companies, which would commission the universities to do "whatever they wanted to be done". SHOKs are not seen as suitable for basic research and in spite of their original goal to pursue long-term pre-competitive research, the research was considered to be quite practice-oriented and mediocre. Overall, researchers tend not to be happy with the concept.

The suitability of the funding instruments of the Academy for SHOKs was also debated and some interviewees found this a problem. Some stakeholders expressed views that funded SHOK proposals are not quite of the high quality of projects normally funded by the Academy. The same argument was expressed in connection with research programme funding in general. The pressure put by the MEC on the Academy to get more engagement in the SHOKs and to fund more SHOK projects was therefore considered negative.

### 3.5 Conclusions

The Academy has a distinct role in the research and innovation system. However, despite changes in the surrounding system, its conception of its role remains rather fixed, implying that change has to take place in other organisations rather than the Academy itself. In the case of the SHOKs,

the combination of shifts in Tekes' work with the static definition of that of the Academy seems to have further distanced them in the implementation of the programme, though the programme design questions are a major reason for the problems observed in the SHOKs. The static role definition also reduces the opportunity for the Academy to play a coordinating or quality-promoting role beyond its traditional sphere of action. The Research Council of Norway's Large Programmes provide an interesting contrast. In addition to its research council function, RCN is also an innovation agency. Its Large Programmes tend to involve a mixture of fundamental and more innovation orientate projects, which are assessed on the one hand using procedures similar to those of the Academy and on the other using innovation-based criteria. This makes it possible to implement coherent programmes that span short- and longer-term needs.

The university reform that has increased autonomy implies a stronger role than before for the universities in devising research strategy. Inevitably, it will take time for strategies to emerge. So far, the incentives available through the Academy to shape those strategies include the possibility to outsource the evaluation of the quality of potential centres of excellence – or clusters of resources – through the peer review processes of the Academy. It can also be claimed that every funding decision by the Academy influences the research profile of the universities. The degree to which these incremental decisions are based on conscious policy focus or profiling depends on the universities themselves.

Overall, the Academy has chosen to act as a strategic advisor on research policy only to a modest extent, primarily focusing on providing information about the state of Finnish science and then mainly focusing on the university part of the system. There is little explicit mention of the public research institutes. It could do a lot more but this would

- Require more analytic resources in house (and a bigger budget for studies)
- Require an explicit separation of the advisory and funding roles, for example by anchoring the advice-giving role at the level of the Academy Board and making that Board more distinct from the Research Council structure

Overall, the Academy could and should play a more active role in science policy. Its focus should, however, be on policy for science. The task is in line with Academy's mission and the ecosystem in which it operates. The MEC is expected to provide a clearer assignment for the Academy for this task and sufficient financial resources it may require. Other advisory tasks, like lobbying for science and science for policy should be addressed by other organisations. The Federation of Finnish Learned Societies could be a candidate for a more active role in the lobbying sense, but it has been fairly inactive in recent times.

The Academy's role in the state funding system has evolved only slowly over time. The recent proposal to reform the government research institutes and to provide them with strategic funding through a new council within the Academy testifies that the funding system has not kept up with changing needs. The proposal is intended to provide a solution for a long-term problem of improving the level of research at government research institutes by making a larger share of their funding competitive. It does not, however, solve the problem of coordination of the research activities of these institutes. Given increasing needs for strategic research in response to the grand challenges, it may be useful further to reform the funding system in a way that injects strategic focus not only into the institute sector but into the research-performing organisations more broadly. The way this can be done without compromising quality and excellence is a challenge for the Academy. However, such a role requires a greater degree of coordination of national strategy and priorities at a higher level than that of the Academy.

This apparent need for a more strategic funder coincides with a decade of weak coordination between the Academy and Tekes, which showed much greater ability to do thematic coordination in the late 1990s, during the time of the additional appropriation for research. It also suggests a need to involve the needs of ministries (and the sectors of society they represent) other than Industry and Education more strongly in overall science policy than has been the case in the past. As these other needs are made more obvious by the grand challenges and in the

implementation of the strategic funding instrument, it appears that the ‘two pillar’ system in practice suffers from a coordination deficit and that there is a need for better coordination and more common strategies horizontally across different sectors of government and society.

Stakeholders would like to see for a more active role for the Academy in science communications. The Academy carries out a broad range of activities to foster dissemination and generate discussion on science-related topics. Many stakeholders feel, however, that there is room for improvement and the Academy could play a much more prominent role at the national level. The Academy is not well positioned to take a leading role in science communication in Finland. However, the Academy has a role and responsibility in science communication. It should focus on the dissemination of the results of scientific research supported by the Academy to a wider audience.

In order to address emergent needs for funding and strategic coordination of research pertaining to major changes in sciences, transformation in industrial structure and needs and wider societal issues, the ‘Grand Challenges’, there are different options.

1. As with coordinated research programmes in the past, a coordinated effort by the Academy and Tekes. In order for this solution to work, both organisations would need to expand their current focus and make an effort to change their operational practices. The inclusion of the societal dimension would require a broader collaboration with other societal stakeholders and research communities. The discontinuation of past coordinated efforts indicates that this solution, if based on voluntary coordination, may not work in Finland.
2. Setting up a new temporary organisation for the coordination of specific areas of strategic research, as examples such as The National Genomics Initiative (NGI) in the Netherlands. The focus of activities would be on coordination of the activities of existing organisations, not on launching specific new programmes. Such a solution would require a great deal of inter-organisational co-operation. It would also entail extra administrative costs. Expertise and knowhow from past practice would be lost and have to be recreated each time one initiative is succeeded by another.

3. Through programming and setting up a permanent organisation for strategic programmes. The challenge in the Finnish circumstances would be the integration of such programmes with the present procedures and activities of Tekes and the Academy.
4. Through the development of the new strategic funding instrument within the Academy with a wider mandate than that related to the present suggestion concerning the government research institutes.

Examples in other countries indicate some pre-conditions for the selected arrangement to work.

Thus, the new initiative should have

- Its own budget and autonomy; thus, power to allocate financial resources to the programmes, and a clear mandate to operate.
- Well-developed and transparent processes for the development of thematic research: such as alignment with national, and international strategic agendas, involvement of stakeholders, etc.
- Not only funding, but also a strategy for the commercialisation (valorisation) and implementation of the outcomes of funded activities and to be taken up by stakeholders.

Despite the fact that the Academy and Tekes coordinate less than before, their respective roles are clearly regarded as complementary. Their processes are different and designed for funding different target groups and different types of activities. Their potential merger – an idea that is sometimes suggested – would involve significant transaction costs and would create a considerable concentration of power.

Governance of the Academy by MEC is relatively hands-off. The example of the SHOKs has shown weaknesses not only in the design of the SHOK instrument but also in the steering relationship between the Academy and the Ministry, with steering signals encouraging the Academy to fund an instrument that turned out to be defective. Policy coordination between the Academy and ministry level will in any case have to be tackled in order to address the ERA instruments (such as Joint Programming Initiatives) because these are often coordinated at the government, rather than agency, level.

# 4 The Academy as a funding organisation

## 4.1 Funding instruments

The Academy has a variety of funding schemes, which aim to support scientific excellence. (The portfolio of the Academy is presented in Appendix B) The current funding scheme was introduced in 2010. The main reason for implementing a new funding scheme was the large number of funding instruments that the Academy managed. The new funding scheme is aimed at streamlining funding opportunities and at eliminating overlap so that funds can be awarded in as large blocks as possible (thereby increasing the efficiency of both the Academy and the research community). Another aim was to make all funding opportunities clearer for applicants and to limit the number of applications. Researchers are now allowed to submit only one application per call.

In the new funding scheme international and inter-sector mobility is included in all funding opportunities (by introducing an obligatory mobility plan to be submitted at the application stage). Within the new funding scheme the following categories and type of grants can be distinguished.

- **Personal grants:** Academy Professor, Academy Research Fellow, Postdoctoral Researcher, Finland distinguished professor programme (FiDiPro), Clinical researcher and researcher mobility programmes.
- **Non thematic projects and programmes:** Academy Projects, Centres of Excellence in Research

- **Thematic programmes:** research programmes, targeted funding, grants for development studies, Antarctic research, Research Projects jointly funded with foreign funding organisation and research programmes in international cooperation;
- **Grants for research infrastructure.**

Most of the Academy's funding instruments aim at supporting free/bottom-up research and are not thematically bound to certain themes or research fields. The Academy funds researchers at different stages of their careers with a focus on the stages after PhD. The main responsibility for researcher training is the prerogative of the universities. However, PhD students are also funded with the Academy's money through the Academy's Projects.

### 4.1.1 Views of stakeholders on the portfolio of instruments

In 2011 the Academy performed a survey, which investigated the Academy's image and customer satisfaction. The results from the survey showed that the funding instrument reform was found successful and that the Academy has a sufficient number of different funding opportunities for every stage of the research career ladder<sup>51</sup>. This was confirmed by the results from the survey (Figure 13) and the interviews performed in the evaluation. The Finnish

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51 Source: the Academy's self-evaluation



scientific community is largely satisfied with the Academy's current portfolio of funding instruments. There was however some criticism of the elimination of the programme for sabbatical grants and the gap in the Academy's portfolio of personal grants. According to the Academy the money could be better spend, as there was hardly any competition within the programme.

Interviewees also said that there is a gap between the Academy Research Fellow and the Academy Professor grant. In practice it is very rare that someone goes directly from being an Academy Research Fellow to an Academy Professor, which means that he/she needs to find funding from other sources (a researcher can only be an Academy Research Fellow once). Data on the age of personal grants holders confirm this perceived gap. There are few other funding opportunities according to the interviewees. Some succeed in obtaining an Academy Project, but it was also felt that this type of grant is much more difficult to obtain nowadays. Acquiring a permanent position at universities is also said to be very rare. As a result, many researchers go abroad (brain drain) or find jobs in other sectors. As a solution it was suggested that the Academy could give a second term to the best Academy fellows. The tenure track system in Finland is still under development, but could possibly offer a solution for the career gap.

## 4.2 Designing research programmes

Research programmes are important funding instruments, which allow the Academy to 'set the agenda' and influence the development of certain fields of research in Finland. Research programmes are the most important thematic and multidisciplinary funding instruments of the Academy. By selecting topics

of the research programmes the Academy can drive the strategic directions of the organisations involved through promoting cooperation and increasing alignment of research directions between different institutions. The decision on the themes of new research programmes is made by the Academy Board. They receive input from the members of the councils. It is not entirely clear how the final decision is made, but according to Academy staff a number of criteria are taken into account in the selection process: it has to be topical, top-level, multidisciplinary and to fit the grand challenges. This latter is confirmed by the Academy in its self-evaluation: "By launching research programmes the Academy directs research to fields that are deemed of key importance to science and society e.g., posed by the grand challenges facing humankind". According to the Academy's website the Board takes into account results of national and international foresights and evaluations. However, there do not seem to be clear procedures or formal criteria in the decision-making.

Before 2011 the whole scientific community was invited to submit applications for ideas for research programmes (online). The current process is still regarded as bottom-up by the Academy as the council members are expected to use (informal) input from the community to formulate their ideas. No external stakeholders are involved in the decision-making. After the decision by the board, the planning phase begins. A steering group, composed of council members and stakeholders (from government/industry), is appointed to coordinate this phase. During the planning a preparatory workshop is organised on content and themes. The steering group still meets once or twice a year after the launch of the programme, but according to the Academy the research council members are less active in the

Figure 13 To what extent do you agree that Academy funding schemes support the creation of a balanced portfolio across the various research domains

| Type of respondent | Agree fully + Agree partly | Neither agree nor disagree | Disagree partly + Disagree fully | Nr. of responses |
|--------------------|----------------------------|----------------------------|----------------------------------|------------------|
| AS                 | 30%                        | 23%                        | 23%                              | 415              |
| GHS                | 45%                        | 19%                        | 11%                              | 395              |

Source: Technopolis surveys - grant holders (GHS) and applicants (AS) of the Academy of Finland, Dec 2012



steering group once the funding decisions have been made and the programme has been launched. There does not appear to be an explicit process through which the Academy decides whether a programme has reached its goals or whether it should be continued. (Most are not.)

#### 4.2.1 Views of the stakeholders on research programmes

Some interviewees were critical of the decision-making process by the Board: they regard it as a political process which is not transparent. Opinions differed among survey respondents regarding the responsiveness of the Academy to inputs from the scientific community (Figure 14). As the Academy looks into the possibility of increasing research programme funding and other strategic funding of the Academy Board<sup>52</sup>, it will become more important to increase transparency in the decision-making process of these strategic funding to ensure support for these funding instruments in the scientific community.

Opinions differed among the interviewees regarding the success of the programmes. Some felt there is little added value or that the programmes do not create synergy between the projects funded. Others felt that the programmes do not target scientific excellence and therefore consider them as inherently second-rate. While most of the research programmes have been evaluated, it is difficult to assess the impact of research programmes relatively soon after the ending of the programme.

The Academy plans further to develop foresight methods for research and make good use of foresight data to identify new scientific initiatives and potential breakthroughs better.<sup>53</sup>

### 4.3 Description of funding processes

The Academy has developed a set of procedures, which support it in identifying and funding research of the highest quality. Figure 15 shows the different

steps in this selection process. The steps are further described below.

#### 4.3.1 Announcement and submission of calls

The Academy has two annual application rounds: in April and September. The September call is the largest. Applications are invited for personal grants (Academy Professor, Academy Research Fellow, Postdoctoral Researcher, clinical researcher), Academy Projects, targeted Academy Projects and possibly for other purposes. In April, funding is available for targeted Academy Projects, Research Programmes projects and other purposes. The deadlines for infrastructures, two-stage calls and calls for international or national research collaboration may differ from the main deadlines<sup>54</sup>.

All calls are published on the Academy's website one month before the call opens. The Academy's website is therefore the most important source of information for researchers. For every September and April-call an extensive document is prepared by the Academy and published on its website. This document describes the general guidelines and the funding schemes that are open for application.

In addition to the online information, the Academy has experimented in 2012 with the organisation of an 'Ask & Apply' road show. During the road show Academy representatives visited almost every research institution in Finland. They presented the funding possibilities and gave researchers the opportunity to ask questions. According to the Academy this road show proved successful as some universities were, for example, not aware of the opportunities to apply for mobility programmes.

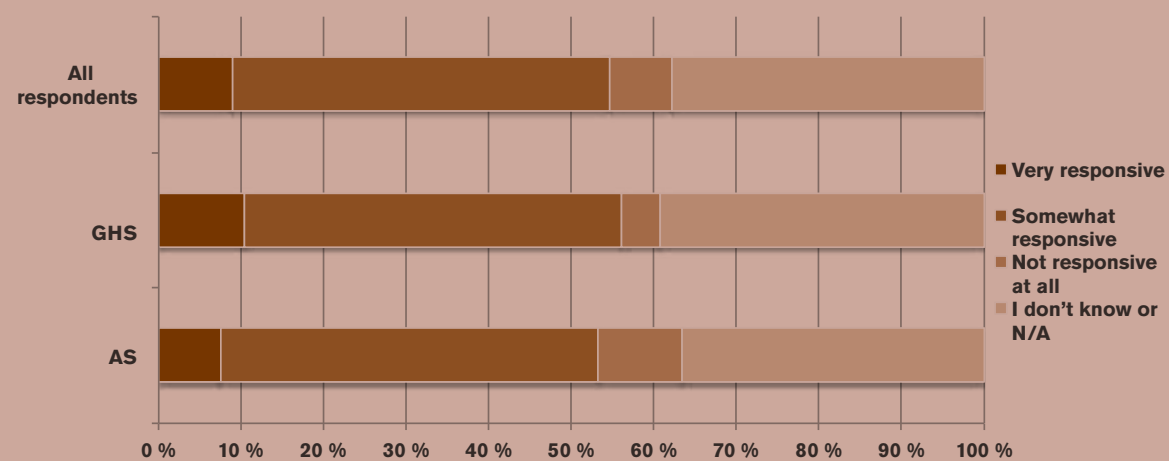
Applications are submitted using the Academy's online services, a web based digital platform. Sign-up is required to be able to access the online services. To support applicants in using the online services, a 19-page document 'How To Guide - to the Academy's online services' is available on the Academy's website.

52 The Academy's self-evaluation

53 The Academy's self-evaluation

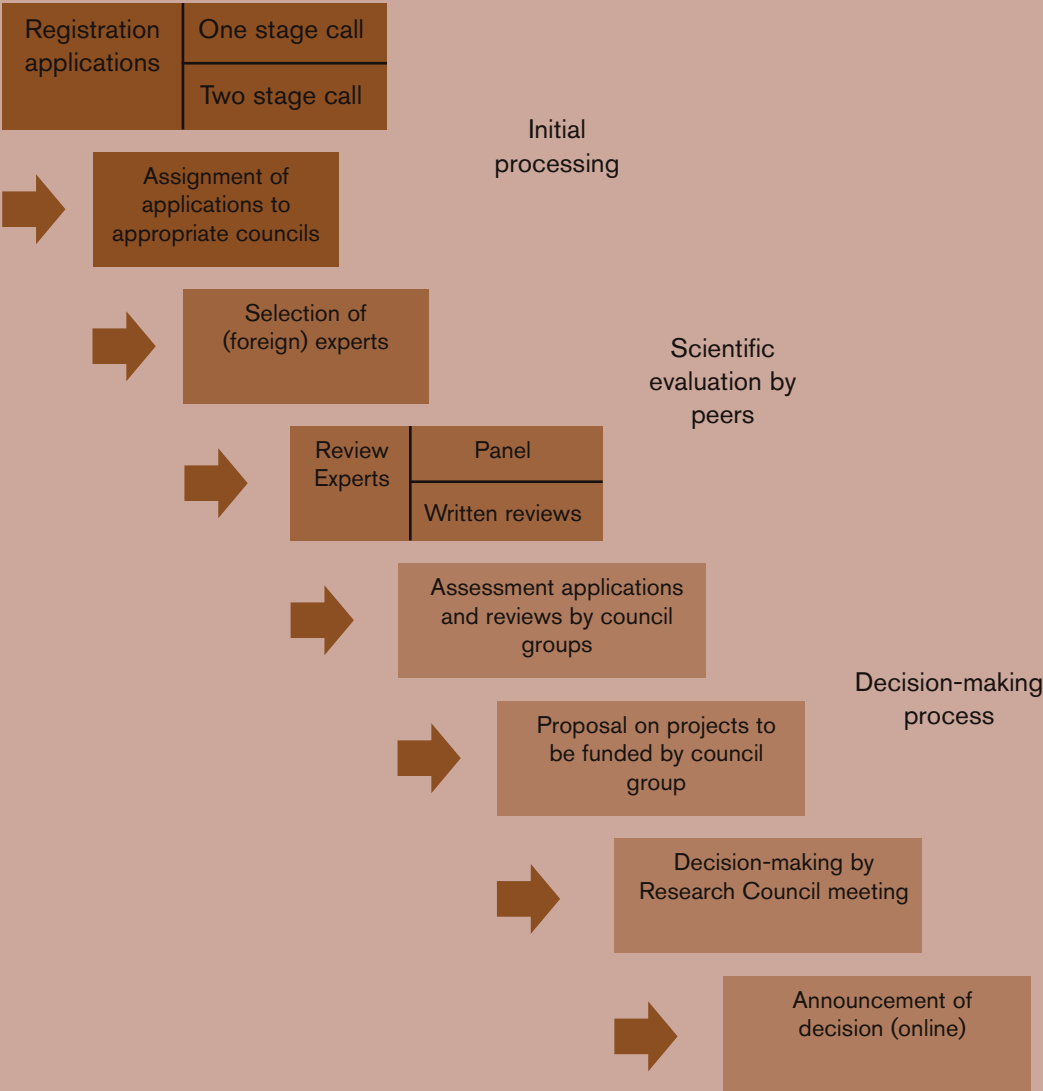
54 September call, 3-26 September 2012, Academy of Finland

Figure 14 How responsive do you find the Academy to inputs from the research community about changes in thematic priorities, for example by starting new research programmes?? (AS n=402 and GHS n=374)



Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 15 Steps in processing applications



Within the same application round, the Academy will review only one application from one and the same researcher in one of the following funding opportunities

- Academy Project (PI of a project)
- Academy Project (PI of a consortium or consortium sub-project)
- Postdoctoral Researcher
- Academy Research Fellow
- Clinical researcher (targeted funding)

Because of the international peer review, applicants are asked (but not obliged) to submit their applications in English. Once the applications are registered, each application is assigned to the appropriate research council.

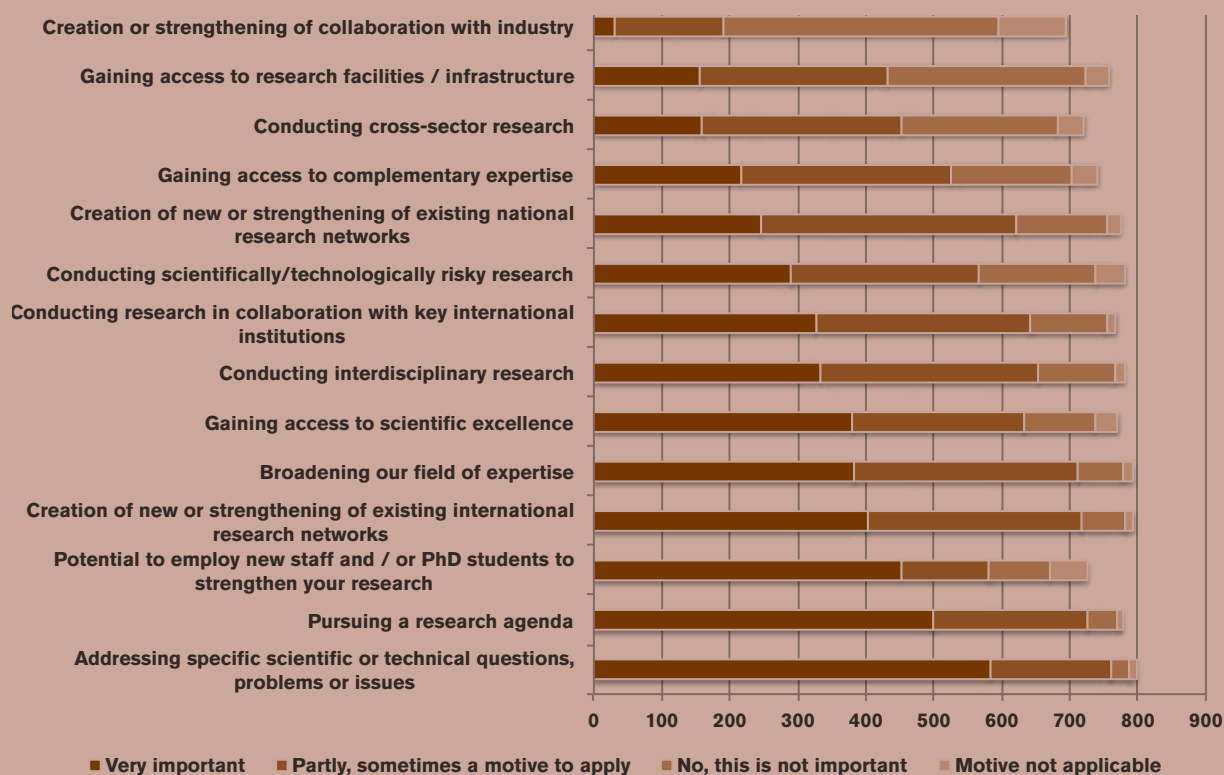
The results of the survey on researchers' satisfaction with the Academy's procedures related to the

announcement and submission of calls are described in paragraph 4.4.1.

### 4.3.2 Views of respondents on motivations for funding applications

Survey respondents were asked how important a number of motives were when they applied for Academy funding. The figure below (Figure 16) shows that the motive considered most important is the motive 'addressing specific scientific or technical questions, problems or issues'. Next in line of importance were the motives 'pursuing a research agenda' and 'potential to employ new staff and/or PhD students to strengthen own research'. Other motives which were related to collaborations, networks, infrastructures, risky or multidisciplinary

Figure 16 Reasons to apply for funding



Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 17 Ranking of the importance of various motivations for application to the Academy's funding schemes by the different groups of stakeholders

|   | Ranking based on all respondents | All respondents of the applicants survey | All respondents of the grant holder survey (GHS) | Grant holders - Academy Fellows and Professors | Grant holders - Post docs | Grant holders- general projects |
|---|----------------------------------|--|--|--|---------------------------|---------------------------------|
| Addressing specific scientific or technical questions, problems or issues       | 1                                | ↔  | ↔  | ↓  | ↔                         | ↓                               |
| Pursuing a research agenda  | 2                                | ↔  | ↔  | ↑  | ↓                         | ↓                               |
| Potential to employ new staff and / or PhD students to strengthen your research | 3                                | ↔  | ↔  | ↔  | ↓                         | ↑                               |
| Creation of new or strengthening of existing international research networks    | 4                                | ↔  | ↓  | ↓  | ↓                         | ↓                               |
| Broadening our field of expertise   | 5                                | ↓  | ↔  | ↔  | ↑                         | ↑                               |
| Gaining access to scientific excellence   | 6                                | ↓  | ↑  | ↓  | ↑                         | ↑                               |
| Conducting interdisciplinary research   | 7                                | ↑  | ↓  | ↓  | ↔                         | ↓                               |
| Conducting research in collaboration with key international institutions        | 8                                | ↔  | ↑  | ↓  | ↑                         | ↓                               |
| Conducting scientifically/technologically risky research                        | 9                                | ↔  | ↔  | ↑  | ↔                         | ↓                               |
| Creation of new or strengthening of existing national research networks         | 10                               | ↔  | ↔  | ↑  | ↔                         | ↑                               |
| Gaining access to complementary expertise                                       | 11                               | ↔  | ↔  | ↓  | ↑                         | ↔                               |
| Conducting cross-sector research  | 12                               | ↔  | ↓  | ↓  | ↔                         | ↔                               |
| Gaining access to research facilities / infrastructure                          | 13                               | ↔  | ↑  | ↑  | ↑                         | ↔                               |
| Creation or strengthening of collaboration with industry                        | 14                               | ↔  | ↔  | ↔  | ↔                         | ↔                               |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

research were less often mentioned as a very important motive for applying for Academy funding.

To establish whether there are any differences between the views of the grant holders of various Academy schemes, the responses were also analysed by funding instruments (Figure 17). The ranking of the motives by the different stakeholder groups was established based on the number of respondents indicating the motive as 'Very important'. The arrows in the table show whether the different motivations were ranked higher or lower by the various stakeholder groups compared to the total average established based on all of the respondents.

For example, the motive 'Conducting scientifically/technologically risky research' is ranked 9<sup>th</sup> by all respondents. The horizontal arrows mean, that this motive was also ranked as the 9<sup>th</sup> important by all applicants similarly to all grant holders. However looking at the responses of the different types of grant holders, it can be established, that Academy Research Fellows assigned higher importance (arrow pointing up) to this motive than the average, while the general project grant holders found the same motive less important (arrow pointing down)

In those cases that the stakeholder group ranked the motive higher than all respondents, the table cell received a dark shade. If the motive was ranked lower by the specific group, the cell received a lighter shade (and grey shade if there is no difference in ranking).

From the Figure, it appears that rejected applicants are less well internationally networked than those who are accepted but they are more orientated towards interdisciplinary work. The Academy Fellows and Professors feel that their fellowships allow them to take more risk and get better access to resources. The general grant holders are not so willing to take risk as those with fellowships nor so interdisciplinary as the rejected applicants.

## 4.4 Review process

How the applications submitted to the Academy are processed and reviewed depends on whether they concern a one-stage or a two-stage call. Smaller grants have a one-stage call, bigger grants has a

two-stage call<sup>55</sup>. Based on the letters of intent in the first stage the Academy's research councils, sub-committee or the Academy board (depending on the funding instrument) decide who will be asked to submit a full application.

The Academy separates scientific evaluation from the decision-making process. Foreign peers, who are selected by Academy staff with input from research council members, mostly do the scientific evaluation. About 60 percent of the (full) applications that are received by the Academy are peer reviewed. These are mostly multi-year research grants (such as Academy Projects, full applications for research programmes, research posts as Post-doctoral Researcher and Academy Research Fellow and full applications for research posts as Academy Professor). The Academy forms the review panels on the basis of demand: when a new research area is gaining popularity, the change has an influence on the composition and division of labour among the panels. When a certain expertise is not available in the panel the application can be sent to an outside expert who is invited to submit a written evaluation of the application(s) concerned. The Academy uses joint panels of research councils for the scientific evaluation of multidisciplinary research projects. According to Academy staff the use of joint panels is established practice between two councils: the Research Council for Biosciences and Environment and the Research Council for Culture and Society. The Academy staff is responsible for assigning applications to the joint panel.

Each review panel meets at the Academy to discuss the applications. In preparation for this meeting panel members are asked to write preliminary reviews (each application is assigned to at least two panel members) using the Academy online services. All preliminary reviews are made available to the panel members, preferably before the meeting. The criteria used for evaluation by peers are:

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55 In the past two-stage calls have taken place with the calls for Academy professors, Finland distinguished professor programme (FiDiPro), Centres of Excellence in Research, Research programmes

Figure 18 Proposal assessment scales – peer review

| Rating | Explanation   |
|--------|---|
| 6      | Outstanding, stands out with exceptional novelty, innovativeness and renewal of science at global level |
| 5      | Excellent, extremely good in international comparison – no significant elements to be improved          |
| 4      | Very good, contains some elements that could be improved  |
| 3      | Good, contains elements that can be improved  |
| 2      | Unsatisfactory, in need of substantial modification or improvement                                      |
| 1      | Weak, severe flaws that are intrinsic to the proposed project or the application                        |

Source: Academy of Finland

Research plan:<sup>56</sup>

- Scientific quality and innovativeness of the research plan
- Feasibility of the research plan
- Ethical questions (to be answered if relevant; no numerical rating)

Competence of applicant and quality of research environment:

- Competence and expertise of the applicant(s)
- Research team and environment
- Significance of research collaborations and researcher mobility
- Research consortium (to be answered if relevant; no numerical rating)

The peers are asked to give a numerical evaluation of the items above (unless otherwise stated) using the scale in Figure 18. They also asked to give a final rating and overall assessment of the application including the strengths and weaknesses as well as possible additional comments.

The panel reviews all the applications assigned to it and prepares one joint review report for each proposal based on the discussions and the preliminary reviews.

After receiving the evaluations from the peers, the research council or steering group (in the case of research programmes) ranks the proposals (A = very good; B = good; C = not to be considered) and make a proposal for the funding decisions. They

attempt to compare and judge the reviewers' scales and to take into account other matters potentially influencing the scales (whether the marks and the statements match, knowledge of previous research in nationally oriented areas in Finland etc). The evaluation panels do not make a ranking list as they are discipline-specific: they behave differently (in spite of the instructions they get from Academy staff) and use different scales in their marking of the proposals.

Multidisciplinary proposals that have been assessed by joint panels are included in the ranking of the council to which the applicant has sent the application.

Often, the A's are awarded grants and the B's needs further discussion (they give B+ and B-). The formal decision is made at the next council or sub committee meeting. The number of positive decisions and the amount of project funding depends on the budget available. The decision by the council is mainly based on the peer review, but science policy-related factors may also play a role in the decisions. Examples of such factors are promoting equal opportunities for both genders, the advancement of junior researchers' careers, as well as the economic, environmental, societal and technological impacts of research. According to an Academy research council member, the council also looks at the number of applications per number of funded projects in each area. This means that even if the panel gives the highest ranking (6), the council can give a B, because the council takes other factors into account.

<sup>56</sup> For the review of a research programme applications, there is an additional sub-item "Relevance of the project to the research programme".



Once the funding decision has been made the Academy sends an e-mail to the applicant and publishes a description of the awards on the Academy's website. Applicants are referred to the Academy's online service for further information. After login applicants can find their decision notification, read the review of their application and accept or reject the funding decision (where it is granted). After the applicant has accepted the funding, her or his institution is required to log in to the Academy's online service and accept or reject the funding. The Academy sends an e-mail conformation to the institution.

Applicants cannot formally appeal against a funding decision.

There have been cases in the past where the Academy has reviewed applications in cooperation with international funding agencies (e.g. for the Antarctic research programme), which according to the Academy's self-evaluation has proved useful.

#### 4.4.1 Stakeholders' views on the funding process

Figure 19 and Figure 20 show the degree of satisfaction of the survey respondents on different aspects of the funding process (separate figures for the non-successful applicants and grant holders). Comparison of the responses between the grant holders and the non-successful applicants show that overall non-successful applicants are less satisfied with the funding process, particularly on the aspects related to the review process, decision-making and the feedback to the applicants (Appendix C.4 ). All respondents were rather satisfied with

- Access to relevant background information for the call
- Frequency of the call for proposals
- Clarity and understanding of the call
- Clarity of the distinction between application types
- User-friendliness of the online application form
- Support during the application process

Grant holder respondents felt quite positive on all aspects related to the funding process, with exception of the time from application to grant (Figure 20). Section 4.6 goes into more detail regarding the appraisal time.

Survey respondents were also asked how responsive they found the Academy to inputs from the research community about the needs for change in research funding rules or schemes (Figure 21). The majority of the respondents found the Academy somewhat responsive to the needs. Quite a large share of respondents did not think the Academy was responsive at all (most of them being non-successful applicants).

Although the survey respondents differed in their opinions on the transparency of the funding decisions - 47% of the GHS were positive versus 23% of the AS -, many interviewees were of the opinion that the decision-making process by the council is not transparent. This is mainly caused by the fact that the relevant council does not inform applicants about the other factors that played a role in the decision; they only receive information regarding the final funding decision and the comments of the peers. One interviewee suggests using a wider scale in assessing the proposals as (quote) "people have had same numbers, and it was arbitrary who did get grant and who not". Overall, there is little knowledge within the scientific community about the process taking place at the council. Some even believe that geographical locations are taken into account. Whether this is indeed the case, is unclear. The Academy could usefully investigate how transparency on the decision-making process by the council can be increased.

Most researchers appreciate this written review report (quote Academy Research Fellow): "It helps understanding strengths and weaknesses of a proposal and also helps learning the selection criteria of a funding organisation". Some interviewees commented on the lack of interaction in the review process: applicants are not allowed to suggest reviewers or comment on the reviews. A rebuttal has been considered by the Academy, but it would further increase the time from application submission to decision-making.

## 4.5 Peer review

The Academy uses peer review as a tool for identifying the best and most promising researchers. However, peer review is often believed to support conservatism and therefore not able to recognise innovative and groundbreaking research. This has been studied and described in many scientific articles on peer review, among which a recent article by one of the members of the evaluation team.<sup>57</sup>

The Academy is aware of the challenge it faces in recognising high risk/high gain and multi- and interdisciplinary research. There is awareness among the staff and council members of the importance of this type of research. An internal survey in 2011, which aimed to investigate the treatment of interdisciplinarity in the assessment process for different instruments, led to ten recommendations. Some of these are already being implemented<sup>58</sup>. Recently, the Academy has revised its review forms so that they better take into account thematic issues<sup>59</sup>. In addition, each applicant has to include a paragraph on risk management (critical points, alternative ways to implement the project) in her or his research plan. The Academy also has joint panels of research councils specifically to assess multidisciplinary projects. Furthermore, ‘standard’ review panels are explicitly asked by Academy staff to pay attention to inter- and multidisciplinary and high risk/high gain projects in their review of applications (quote Academy staff member): “We advise council members and panellist on this: if there is a good risk assessment, a risk is no problem. In our opinion this system works.” The instructions for peers for evaluating research proposals states on page one that “At all levels of the evaluation process, you are advised to pay attention to potential breakthrough research containing risks”.

Like other funders, the Academy thus devotes attention to the need to fund ‘high risk’ research (on the implicit assumption that research that is risky also has high returns). This concept proves hard to operationalise, and is largely tackled by asking reviewers to bear in mind the need to fund risky research.

Conceptually the idea of risky research needs unpacking if it is to affect funding practice. Most often it refers to research that is expected to be path- or groundbreaking, but precisely because of this, entails uncertainties concerning the achievement of the project goals.

Häyrynen points out<sup>60</sup> that high-risk (or ‘transformational’ or breakthrough) research has been regarded as a key issue for research councils, especially in the last decade or so. He identified seven types of risk, not all of which are desirable in funded projects.

1. Risk related to the research objectives , such as whether the objectives are realistic and attainable in the first place or whether failure is very likely
2. Risk related to the research methods , such as the use of an untried method, a dataset that is poorly fitted with the method or the wrong kind of research tools
3. Risk related to the field of research, such as the sense that the subject is too marginal or (in Finland) in an orphan situation, and on the other hand that the field is too crowded
4. Risk related to personnel, such as the lack of scientific merits or the anticipated weakness of the manager's role
5. Ethical risks related to the research, such as data protection issues
6. The risk connected with interdisciplinarity , i.e. weak links between researchers or participating projects representing different fields of science in interdisciplinary or multidisciplinary programmes
7. Risk related to resources, i.e. the research cannot be completed with the resources projected in the research plan or on timetable.

Häyrynen used a sample of 206 applications to the general research grants scheme in 2005, and classified them in terms of novelty and risk, based on

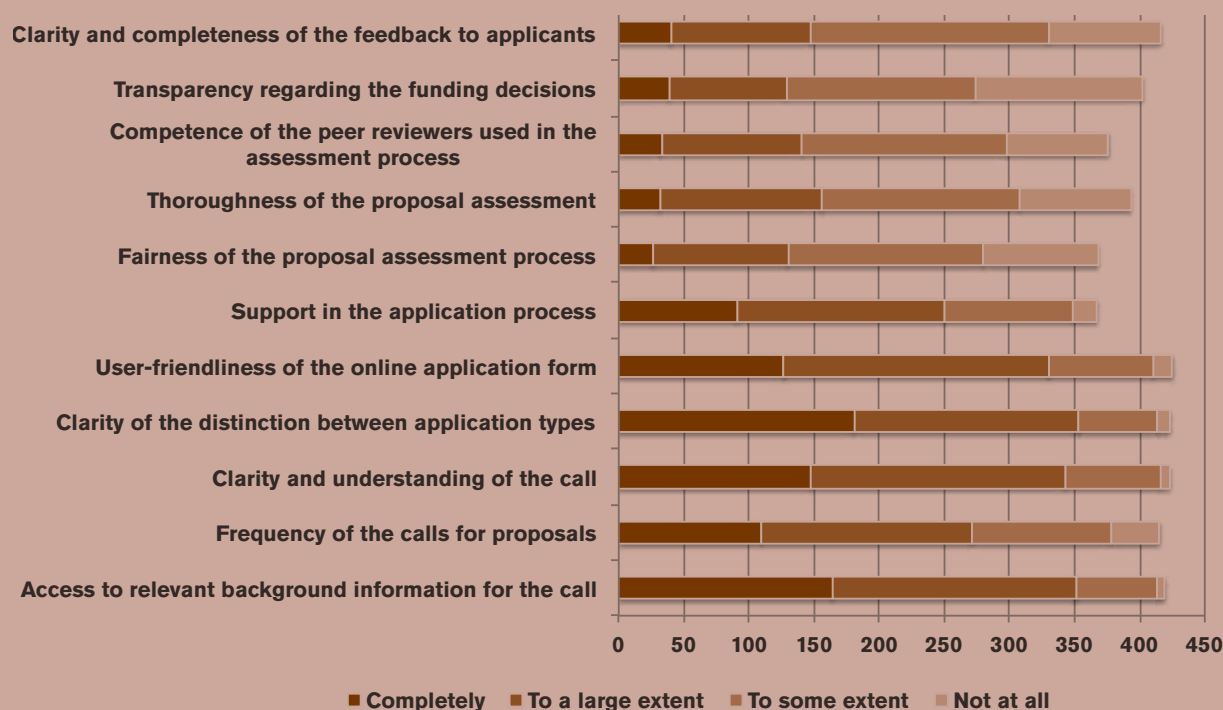
57 Luukkonen, T. (2012) ‘Conservatism and risk-taking in peer review: Emerging ERC practices’, *Research Evaluation* 21 pp. 48–60

58 The Academy's self-evaluation

59 “If the project is multi/inter/transdisciplinary, how?” was changed to “If the project is multi/inter/transdisciplinary, what is the added value of this?”. Source: the Academy's self-evaluation

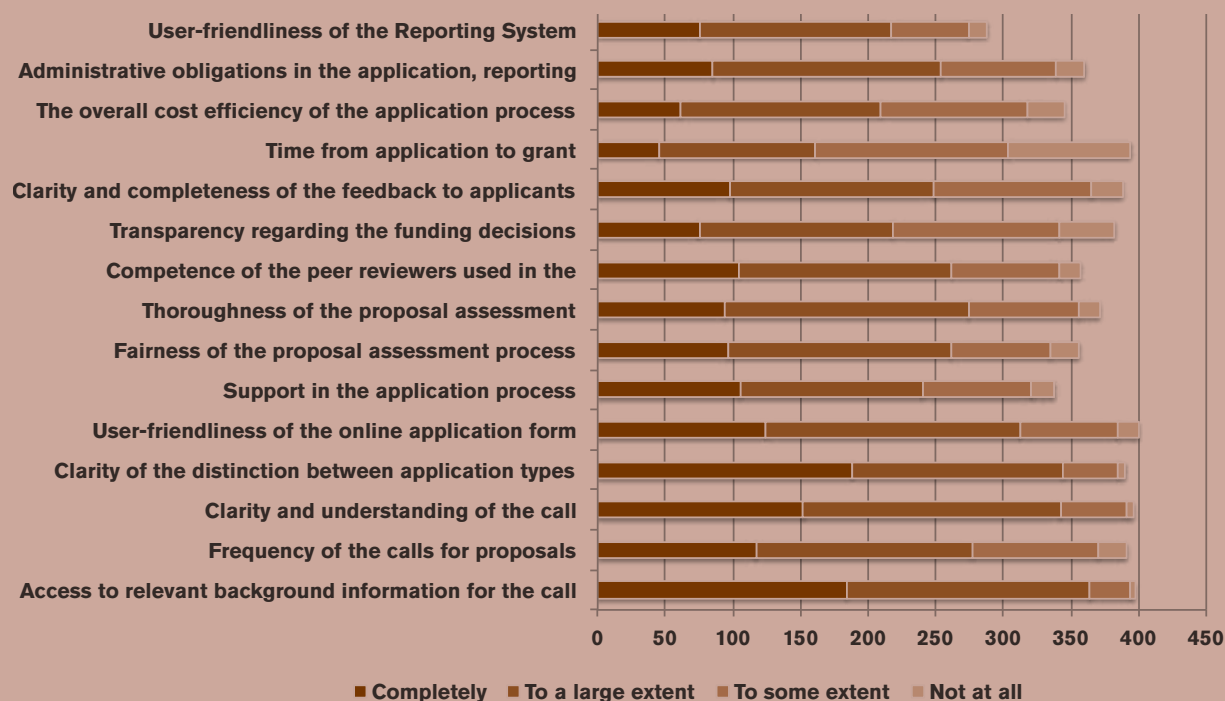
60 Maunu Häyrynen, *Breakthrough Research: Funding for High-Risk Research at the Academy of Finland*, 8/07, Helsinki: Academy of Finland

Figure 19 Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory – Non-successful applicant survey



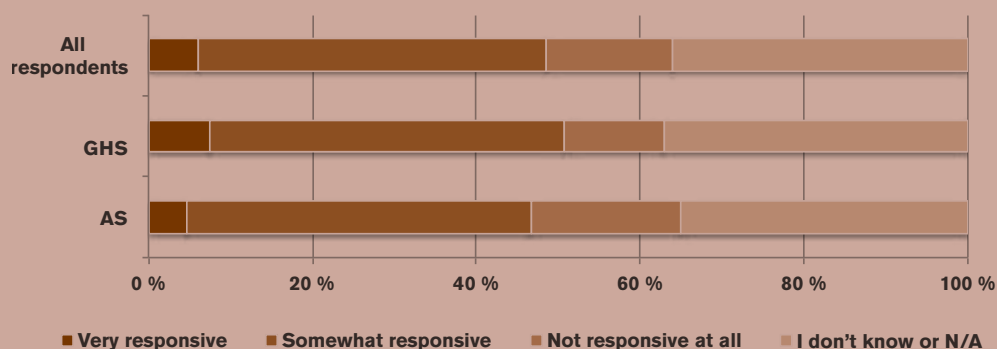
Source: Technopolis survey – Non-successful applicants of the Academy of Finland, Dec 2012

Figure 20 Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory – Grant holder survey



Source: Technopolis survey – Grant holders of the Academy of Finland, Dec 2012

Figure 21 How responsive do you find the Academy to inputs from the research community about: Needs for change in research funding rules or schemes? (AS n=403 and GHS n=377)



Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

reviewers' comments. He checked his classification against the perceptions of the relevant project officers in the Academy and concluded that while the treatment of high-risk proposals was uneven, high-risk but innovative projects were much more likely than others to be funded. He recommended that project reviews should take greater account of the originality of research plans, conscious risk-taking and the potential for scientific breakthroughs but that assessment of high-risk proposals should continue to be 'mainstreamed' within the normal review process. Projects identified as high risk should be more closely monitored than more routine ones.

One of the council members suggested earmarking some funding for this kind of research. One way or another, it is advisable to develop a more specific approach to ensure that high-risk/high-gain research proposals can succeed at the Academy. There are examples at other funding agencies where risky projects receive funding using a step-by-step approach. First funding is supplied for the proof of concept phase of the project and only after it has proven successful does the rest of the funding follow. The US Department of Defense has a tradition of devoting 10% or so of research programmes to high-risk research (which we have heard described in the Pentagon as 'lunatic fringe' research).

The Academy is continuously trying to improve the selection process. They have experimented with the use of peer review as a tool. For example, in the past they tried the 'written panel system', but found that face to face meetings between panel members

are more useful (quote Academy staff member): "These meetings helps to recognise differences between views in grades, so you get a more standardised way of assessing proposals". During the meeting the Academy staff are also present and support the process. The Academy has also experimented with organising panel meetings in the USA with mostly local peers, but did not find this satisfactory.

#### 4.5.1 Stakeholders' views on the peer review system

A high percentage of the survey respondents feel that the Academy should focus more on risky basic research in the future (40%). This is least felt by researchers in the field of culture and society and most by researchers in the field of natural sciences and engineering (Figure 22). Twenty-five percent of the survey respondents feel that the Academy has a balanced portfolio of activities, while the same percentage would like to see more focus on mainstream basic research. There is less need for an increased focus on strategic research. Interviewees from the scientific community also felt that the Academy should pay more attention to high-risk/high-gain research and are not convinced that this type of research is prioritised by the Academy. Quote from Academy Research Fellow: "The Academy mentions on their web pages that they would support this type of research, but I would still not go to the Academy for the craziest ideas. Mainly because of the level of

reviewers, this makes such a huge impact on whole process. I would not have submitted my ERC grant to the Academy: the Academy would find it too risky”.

Other interviewees also addressed the power that lies with individual persons (either panel members or members of the research councils) (quote Academy Research Fellow): “If reviewers are aware that it is something new or valuable, they will give good scores. Not too much of a problem. Problem might be if a single person is not aware of new, emerging research, he/she has power to shut down applications. But if they are an expert, they will know of these new fields.” Academy staff members are aware of the need to pay attention to risky research. However, this not the same as actually rewarding of this type of research. Or as a council member said (quote): “High risk high gain research: we are discussing this a lot. There is attention for this issue, that’s positive. But research councils are conservative. The system works in such a way: peers evaluation and 20% success rate. Only proposals with very high numbers are being funded. The Academy is not a risk funder.” It is very likely that there are differences between the research councils. According to a member of the Research Council for Culture and Society this council explicitly aims to support new research areas and fields and is less inclined to focus on those researchers that are (only) top researchers.

Interviewees are generally more positive regarding the Academy’s focus on multidisciplinary research, although the Academy’s council structure is not very conducive to it because of its disciplinary structure, which encourages conservatism. One of the Academy’s staff members believed that the Academy’s fixed budget for research councils is a barrier to more multidisciplinary research as the fixed funding goes to the core of the councils and there is not enough funding left for multidisciplinary or strategic research. Another interviewee found that in terms of obtaining funding for interdisciplinary research the Academy is the only place to turn to. It was suggested that part of the budget should be earmarked for inter - and multidisciplinary research.

#### 4.5.2 Nationality of the peers

From 2007-2011 in total 25,657 reviews were performed by peers. The number of reviews varied from 4,486 in 2008 and 5,899 in 2010 (data not shown). Most reviews are performed by foreign scientists to increase the likelihood of obtaining an unbiased and independent view. The ratio between the numbers of reviews by nationality of peers is shown in Figure 23. Figure 24 and Figure 25 show the total number of reviewers per country (2007-2011) and the change in share in number of reviewers per country between 2007/2008 and 2011/2012. Most reviews have been performed by scientists from the UK, second in line is Germany, followed by Sweden. Finnish scientists were on average responsible for 9% of the reviews, but this varied from 13% in 2008 to 5% in 2009 (data not shown). Overall there are large differences between the contribution of peers of a certain nationality per year: while in 2010 the USA was responsible for 15% of the total share of reviews, this was only 4% in 2011. As Figure 25 shows, the share of German reviewers has increased the most (2007/2008 versus 2011/2012).

Some of the interviewees were of the opinion that the Academy in recent years has used more peers from Eastern-European countries, which they felt had a negative effect on the quality of the reviews. Figure 25 shows that there has been a minor increase in certain Eastern-European countries, while others have decreased.

According to the Academy’s self-evaluation, the Academy monitors the composition of the review panels regularly on gender equality and country of origin. However, it can be rather difficult to find female peers in certain scientific fields.

#### 4.6 Appraisal time

It takes around 6-7 months before applicants are informed of the Academy decisions. Especially during the largest call, in September, there is high pressure on Academy staff to coordinate the review of the large number of applications efficiently. According to an Academy staff member, the aim is to make the process as short as possible: “That means that we

Figure 22 How do you see the role of the Academy in the future? Should there be a shift in its activities (basic research versus focus on strategic research)?

|   | No, the Academy has a balanced portfolio of activities | Yes, there should be more focus on mainstream basic research | Yes, there should be more focus on risky basic research | Yes, there should be more focus on strategic research e.g. economic and societal themes | Nr. of respondents |
|---|--|--|---|---|--------------------|
| <b>All respondents</b>  | 25%  | 24%  | 39%   | 12%   | 757                |
| <b>By survey group</b>  |  |  |   |   |                    |
| <b>AS</b>   | 16%  | 28%  | 41%   | 14%   | 388                |
| <b>GHS</b>  | 34%  | 20%  | 36%   | 10%   | 369                |
| <b>By type of organisation</b>  |  |  |   |   |                    |
| <b>Research institute</b>   | 29%  | 16%  | 38%   | 17%   | 76                 |
| <b>University</b>   | 25%  | 25%  | 39%   | 12%   | 658                |
| <b>By research field (categorised according to the research councils)</b> |  |  |   |   |                    |
| <b>Biosciences and Environment</b>  | 26%  | 29%  | 38%   | 7%  | 167                |
| <b>Culture and Society</b>  | 26%  | 20%  | 29%   | 25%   | 194                |
| <b>Health</b>   | 25%  | 24%  | 42%   | 10%   | 110                |
| <b>Natural Sciences and Engineering</b>                                   | 24%  | 25%  | 44%   | 8%  | 280                |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

have to work really hard. We want to make sure the applications are going to the right reviewers. And we have to make sure the panel statements go quickly to research councils. Panels have 1-2 months to read the applications. Even though it is a very stressful time, we think our approach is the best way to do it.” Although some interviewees did find that the review process takes a long time, they did not feel that the Academy should compromise on the quality of the process by speeding things up. Some of interviewees did complain about the time between decision-making and receiving actual funding.

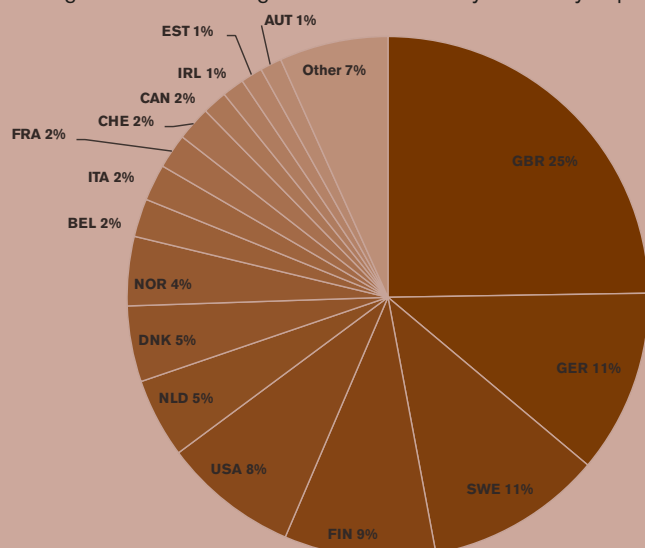
According to the Academy, the average time between the decision and the start of the project is 2.6 months for Academy Projects and 4 months for Academy Research Fellows. Applications that are submitted in the September call are generally informed of the Academy’s decision in March/April. However, funding may not become available before September. This is especially a problem for younger researchers, such as PhD students. PhD students are

obliged to finish their PhD before they are allowed to apply for a Postdoctoral Researcher grant in September. If their PhD ends in October, they have to wait 11 months before the earliest possibility to submit. And then wait for another 12 months before funding becomes available. They often have to leave university during this period and wait, or rely on other financial sources.

The satisfaction on the time it takes from submission of application to the receipt of the grant was part of the survey among the grant holders. Of all the aspects related to the funding process, this aspect was the least satisfactory to the grant holders (Figure 26). Both grant holders and non-successful applicants were also questioned in the survey on the amount of time spent on the application procedure, taking into account the success rate of the funding schemes (Figure 27). Most grant holders find the amount of time spent reasonable (54%) or very



Figure 23 Ratio among number of reviews by nationality of peers (2007-2011)



Note: Category 'Other' are countries with less than one percent of total share.  
Source: Academy of Finland.

Figure 24 Number of reviewers per country (total 2007-2011)

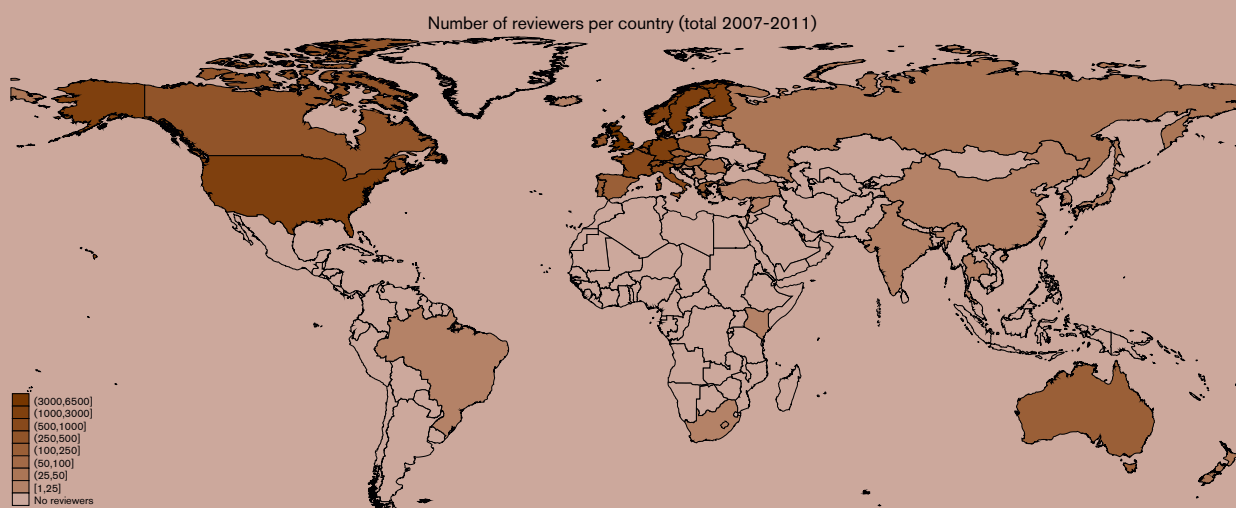
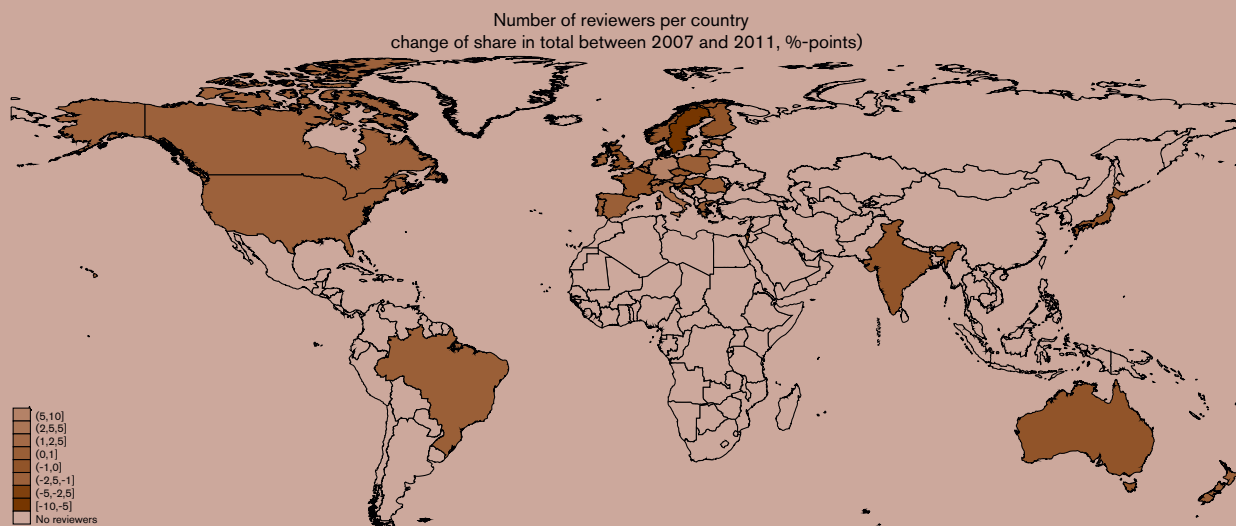


Figure 25 Change of share in number of reviewers per country between 2007/2008 and 2011/2012 (%-points)



reasonable (14%). The opinions between the non-successful applicants are less positive: 43% finds it (very) unreasonable versus 31% (very) reasonable.

## 4.7 Confidentiality and conflict of interest

In Finland, the Act on the Openness of Government Activities (621/1999) applies, among other things, to application documents and expert review reports. According to the Act, research plans, abstracts, progress reports and review reports are confidential documents. Application documents should therefore be handled and stored with due care and confidentiality.

Reviewers are required to declare any personal interests. Reviewers must disqualify themselves if they can in any way benefit from the approval or rejection of a proposal. They must also disqualify themselves in the following circumstances

- If they have close collaboration with the applicant (e.g. have co-authored and published an article with the applicant during the past three years, have been involved in the preparation of the application, or are involved in the publication or application of the results)
- If they have been a superior, subordinate or instructor of the applicant during the past three years
- If they are currently applying for the same post as the applicant
- If they are currently applying for funding from the Academy from the same funding instrument

## 4.8 Reporting

All Academy grant recipients have to send the Academy a report of their activities after their funding period has ended. The reports contain data about the scientific progress and data on publications, outcomes and researcher mobility, etc. During the project the Academy monitors progress by the financial reports/invoices, which are submitted three times a year (using

the Academy's online invoicing system)<sup>61</sup>. It includes an account of the use of the funding (by type of expenditure) and data on FTEs (staff according to the proportion of full-time hours they work) and is part of the request for payment. These financial reports are checked by the Academy employees of the respective research units: is the money spend according to plan, has the personnel been hired as proposed. However, as the Academy staff only receives a financial report and no activity report, and is not financially expert, it is difficult to perform this check. According to Academy staff the system is still under development: they are still learning how to handle the requests of payments. It was also stated by Academy staff that a university can invoice the Academy up to 900 days after the research has ended. According to Academy staff this is a long time. It would be better if this could be changed into 100 days.

Monitoring Academy research programmes is the responsibility of the steering group and the programme coordinator, who together drafted a programme-specific plan for monitoring and evaluation. In addition to research reports, research programmes may also be requested to submit other reports, e.g. annual reports. External reviewers have evaluated most of the Academy's research programmes. The evaluation report are publicly accessible on the Academy's website. According to the Academy the evaluation of research programmes is currently under discussion: should they evaluate every programme separately or combine the evaluation of 2-3 programmes. They also expect a shift in approach, as they are moving away from scientific evaluations of their programmes on project level, which they find very time consuming.

Scientific advisory boards, to which the Centres report on their activities, Monitor the Centres of Excellence. In 2009 an impact evaluation of the Academy

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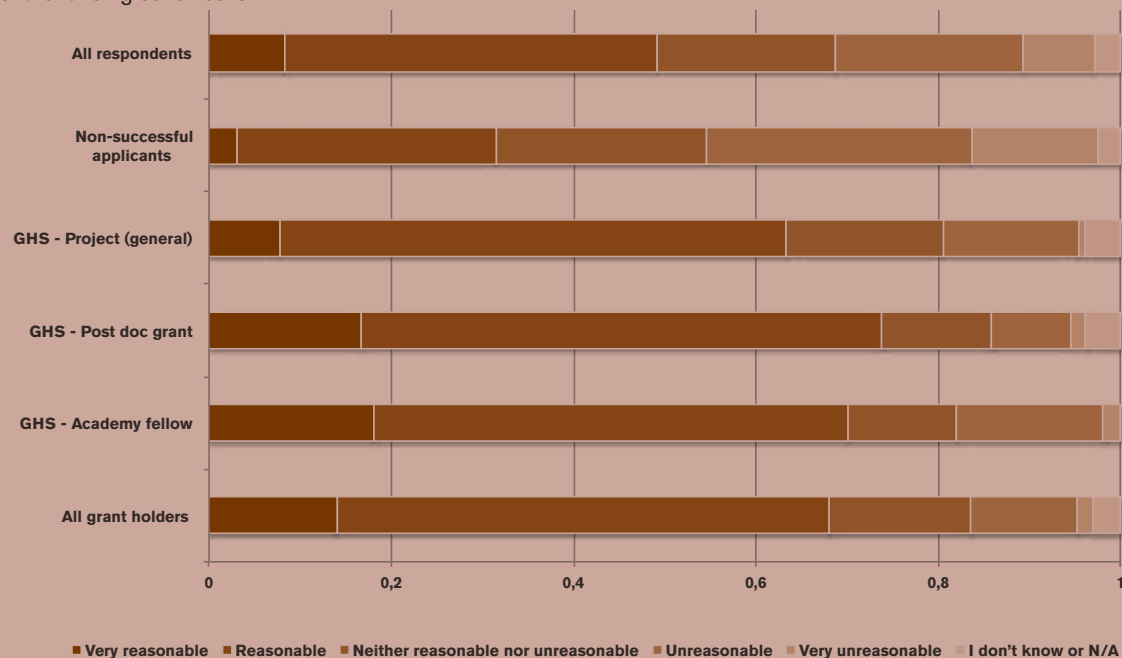
61 The changes in the legal status of the Finnish universities has had an impact on the invoicing practices of the Academy. With the entry into force of the new Act, the Finnish universities ceased to be central government accounting offices. As a result, the Academy was no longer able to transfer the amounts of research funding granted to universities into a budget account as before. As of the beginning of 2010, all recipients of Academy research funding were required to invoice the Academy for research funding decisions (source: the Academy's website).

Figure 26 Appraisal time (in months) of applications received between 2007-2011

| Type of funding          | 2007 | 2008 | 2009 | 2010 | 2011 |
|--------------------------|------|------|------|------|------|
| Academy projects         | 7.82 | 7.78 | 7.83 | 7.60 | 7.39 |
| Academy research fellows | 5.92 | 5.85 | 5.93 | 5.65 | 6.45 |
| Postdoctoral Re-searcher | 7.82 | 7.86 | 8.23 | 7.72 | 6.64 |

Source: Technopolis, based on data from the Academy of Finland

Figure 27 How far do you feel that the amount of time spent on the application procedure taking into account the success rate of the funding schemes is:



Source: Technopolis surveys - grant holders and non-successful applicants of the Academy of Finland, Dec 2012

programmes for centres of excellence was performed (report available on the Academy's website).

Interviewees were positive about the level of reporting that is required (quote senior researcher): "There is a low level of reporting to the Academy during projects, compared to other (foreign) funders. There is a certain level of trust. We can focus on research instead of writing intermediary reports". There were some comments on the restrictions of the budget that is allowed to be transferred to the following year (quote senior researcher): "You can move only 15% to the next year. That is harmful to science. This is linked to state budgets, but not flexible from a science point of view. That should be changed". This was also an outcome of the survey in 2011,

which investigated the Academy's image and customer satisfaction: the Academy is less successful in the flexibility of funding<sup>62</sup>.

## 4.9 Full cost model

A full cost funding model has been used by the Academy, the Finnish universities and government research institutes since 2009. This was originally triggered by the intention to use a Full Cost Model in EU programmes. In the performance agreements between the Ministry of Education, Science and Culture, the universities and the Academy of Finland in 2009 all

<sup>62</sup> Source: the Academy's self-evaluation

parties agreed to apply the full cost model in the cost calculation of jointly funded projects<sup>63</sup>.

An expected benefit of the full cost model is to increase the dynamics of the research system by basing it on better information. With full cost financing it becomes more attractive to become successful in grant applications and universities are expected to compete with each other more strongly to employ excellent researchers and aim for the highest quality. Another important benefit is that the full cost model increases transparency: universities have to justify what costs are needed for conducting research and they have to introduce a system that monitors their employees' working time.<sup>64</sup>

The full cost model applies to most of the funding granted by the Academy, except for the Academy Professors and Academy Research Fellowships. It covers the costs, both direct and indirect, related to a research project. The indirect costs are calculated using a coefficient. There are two types of indirect costs: the employee costs and other costs (also known as overhead). Indirect employee costs are calculated as a coefficient of the direct employee costs. The overhead is calculated as a coefficient of the total sum of employee costs (both direct and indirect). Figure 28 shows the types of cost involved with direct and indirect costs.

The indirect employee costs used by Finnish universities are on average 53% and have remained more or less the same from 2009 (52.8%) to 2012 (52.6%)<sup>65</sup>. The average overhead costs vary from year to year and show a growth of 7.0% between 2009 and 2012 (2009: 84.4%; 2012 90.4%). The numbers differ greatly between universities, both in indirect employee costs and overhead costs (ranging from 45% to 73% for indirect employee costs in 2011 and from 67% to 112% for overhead costs in

2011). There are also large differences in overhead costs within one university. The biggest difference between overhead costs within one university was from 74% to 107% (in 2011). These variations are often explained by the difference in nature of the science fields (in use of building/equipment etc.). The indirect employee costs show no variation within universities. At the University of Turku (2012) the indirect employee costs are 51%; the indirect overhead costs are 82% (technical sciences) or 67% (other sciences). The university allocates 20% of the total overhead to the university's central administration, 15% to the faculty and 15% to the department. The rest of the overhead (50%) is allocated to the cost centre of the project leader. According to the university "the refund is used in all levels to cover the deficits of basic funding".<sup>66</sup>

The full cost model was first applied at the Academy in the January 2009 call. The introduction of the full cost model gave rise to considerable debate and a large number of questions to the Academy. According to the Academy the introduction of the full cost model had no impact on the number of applications, where variation fell within the normal range. However, the sums applied for had grown considerably while the total sum of research funding available for distribution by the Academy had not increased as a result of the introduction. As a result of this, a large decrease in success rates would be expected, but Figure 29 shows that the Academy was still able to grant 35% of the projects, which is slightly less than in 2008 and part of an ongoing downward trend. The largest decrease in number of applied projects occurred in 2011 (3140 applications versus 4177 applications in 2010) and is mainly caused by the implementation of the new funding scheme. In 2010 – 2011 approximately 70 % of the applications used full cost model.

As of the September 2012 call the Academy's contribution to funding is maximum 70% of the total costs of a project (before this it was 80%). The percentage is equally applicable to all project costs,

63 The background to this is a model for the cost calculation of jointly funded projects drafted in the early 2000s under the Ministry of Finance (Accounting for total costs and financing jointly financed activities based on total costs, Ministry of Finance Working papers, 9/2007)

64 Presentation 'Full costing in Finland' by Marita Virtanen, Chief Adviser TEKES Research Funding, 2012

65 Source: the Academy of Finland (full data not shown here, for internal use only)

66 Presentation 'Full costing principles and practices in the University of Turku' by Meri Louhi Head of Administration, University of Turku, 2012.

that is, to both direct and indirect costs, including overheads. By decreasing the percentage the Academy aims to increase the number of projects funded and thereby increase the (research) impact of Academy. It is also a signal of the Academy's worries about the increasing overhead costs. In 2010, the Academy made funding decisions according to the full cost model worth 243 M€. Some 36% of this amount was overheads.<sup>67</sup> According to information from Academy staff, in 2010 the beneficiary organisations' self-financing percentage (the organisation's own funding contribution to the total costs of a co-funded project) was 26% thus Academy's percentage was 74%. Contrary to the original thinking the Academy's funding percentage has settled near to what was supposed to be the upper limit.

<sup>67</sup> Source: Academy of Finland

#### 4.9.1 Stakeholders' view on the full cost model

Interviewees were very negative about the full cost model. It was also often mentioned by survey respondents as a source of frustration. Arguments against the full cost model that were mentioned, were the decrease of success rate (and thus tougher competition), the money goes to the university administration (and not to researchers). There were claims that some schools do not allow their researchers to apply for the Academy money any more. A problem, which was also mentioned by several researchers, is that they tend to underspend their money, because they have no insight in the actual money they spend (because overhead is calculated by coefficient of salary). Because of their conservatism in spending, they have a lot of money left in final year of project. Although the Academy stated in a letter to universities that it prefers the funding granted for overheads to be used specifically in support of the project of the researcher that the Acad-

Figure 28 Full cost model: type of costs

|                       | Direct costs  | Indirect costs (coefficient)  |
|-----------------------|---|---|
| <b>Employee costs</b> | Direct salary costs (= effective working time)  | <ul style="list-style-type: none"> <li>▪ Statutory social fees: pension, social security charges, compulsory insurances;</li> <li>▪ Holiday salaries;</li> <li>▪ Paid leaves of absence;</li> <li>▪ Health care.</li> </ul> |
| <b>Other costs</b>    | <ul style="list-style-type: none"> <li>▪ Travel;</li> <li>▪ Consumables;</li> <li>▪ Equipment;</li> <li>▪ Subcontracting;</li> <li>▪ Other</li> </ul> | Overhead: <ul style="list-style-type: none"> <li>▪ IT/phones;</li> <li>▪ Depreciation</li> <li>▪ Administration/library/service centre;</li> <li>▪ Facilities.</li> </ul>   |

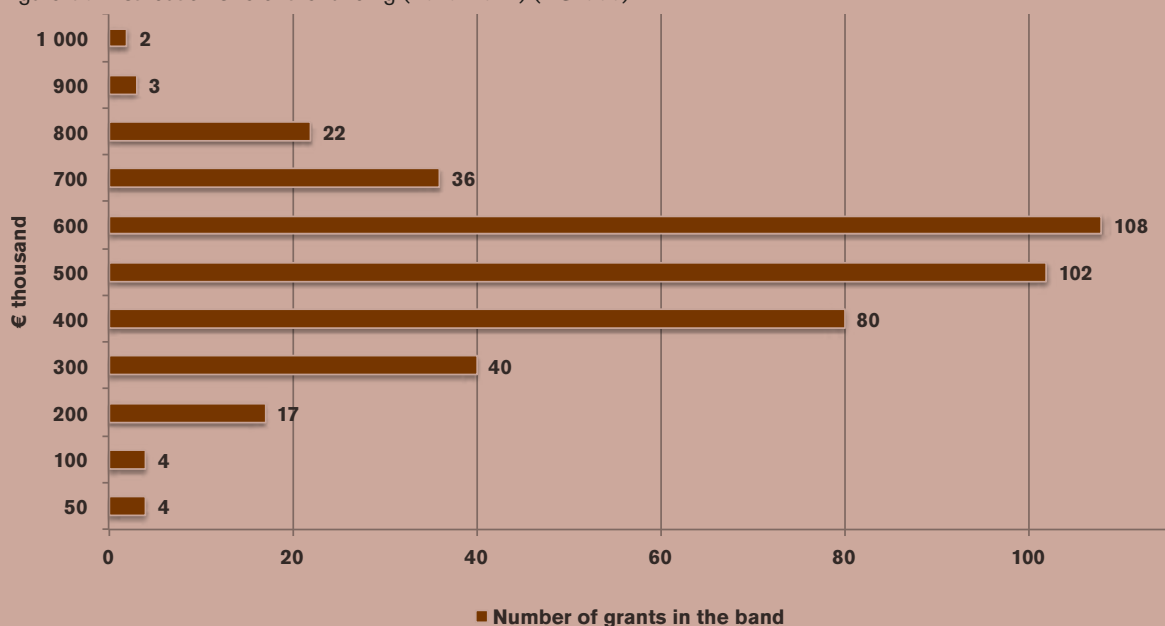
Technopolis Group, 2012

Figure 29 Number of applications and success rate (2007-2011)

| Year | Applications | Granted | Success rate (%) |
|------|--------------|---------|------------------|
| 2007 | 4736         | 2029    | 42.8%            |
| 2008 | 4116         | 1667    | 40.5%            |
| 2009 | 4275         | 1590    | 37.2%            |
| 2010 | 4177         | 1455    | 34.8%            |
| 2011 | 3140         | 967     | 30.8%            |

Academy of Finland

Figure 30 Distribution size of the funding (2010-2011) (x €1000)



Note: The funding (per category – less than) from the Academy Projects (2010-2011), Academy Professors (2010-2011), Academy Research Fellows (2010-2011) and Postdoctoral Researcher (2010-2011). This figure shows the funding (per category – less than) from the Academy Projects (2010-2011), Academy Professors (2010-2011), Academy Research Fellows (2010-2011) and Postdoctoral Researcher (2010-2011).

Source: Academy of Finland.

emy is funding<sup>68</sup>, it has no idea or control on what happens to the funding. This was often mentioned by the Academy staff as a source of frustration.

Overall, the full cost system does not seem to offer what was promised. It is a question whether a fixed overhead percentage would solve matters. It would make universities less independent and would require different numbers for different disciplines. However, it might be useful to reconsider how to implement the model, as the disadvantages currently seem to outweigh the advantages.

#### 4.10 Size of the grants

The majority of the grants (40%) that the Academy provided in 2010-2011 lay between €300-400k (Figure 30 shows only the grants on Research Projects, Academy Professor, Academy Research Fellow and

Postdoctoral Researcher). There are few grants of less than €200k or above €800k (all Research Project grants). The majority of the Academy Projects grants are between €500-600k and €600-700k. Academy Professor grants are in the category of €700-800k, Academy Research Fellow €300-400k and Postdoctoral Researcher €200-300k.

#### 4.11 Success rates

This paragraph describes the success rates at the level of

- Funding schemes
- Research organisation
- Gender balance
- Research council

<sup>68</sup> Letter to rectors of universities and directors of research institutes, 10 December 2008, Academy of Finland.



#### 4.11.1 Analysis at the level of funding schemes

Figure 31 shows success rates of the Academy funding schemes. There are a number of funding schemes where the competition has taken place before applicants send their applications to the Academy, meaning that all applicants are entitled to get funding. These funding schemes are not included here, but are described in Appendix C.2 .

From 2007-2011 the Academy received in total more than 15.000 applications for the competitive funding schemes (not including those schemes where competition has taken place before the applicants send their applications, see Appendix C.2 Fifty percent of the applications were for personal grants, 36% for non-thematic projects and programmes and 14% for thematic programmes. The Academy Project was the most popular funding scheme in 2007-2011 with over 5618 applications (on average more than 1100 applications per year). The overall success rate of the Academy's funding schemes is 29%, but there is a large range of (net) success rates. They vary between 82% (Researcher mobility to Finland) and 12% (Academy Research Fellow). When including the two-stage funding schemes, it becomes clear that the Academy Professor grant has the lowest (gross) success rate (5%). This makes the Academy Professor and the Academy Research Fellow the most competitive grants. As researchers' careers develop, it becomes increasingly difficult to obtain a grant. From 2007-2011 there were 861 grants for Postdoctoral Researchers available, 296 grants for Academy Research Fellows and only 40 grants for Academy Professors (with success rates of respectively 25%, 12% and 5%).

From 2007-2011 €600m funding was allocated to non-thematic projects and programmes and €179m (30%) to thematic programmes. The total amount of funding granted on personal grants from 2007-2011

is unknown<sup>69</sup>. Some of the interviewees found that the proportion of funding spend on thematic programmes is rather low. Others felt it was too high. It is unknown how the division of funding has developed over the years, as data were not available per year.

According to the Academy's self-evaluation the Academy aims to decrease funding of Postdoctoral Researchers in its next planning period. The success rate is highest for this scheme and in the current system the Academy believes there are too many postdocs compared to the positions available in more advanced stages of researchers' careers. Postdocs will however continue to be funded through other funding schemes such as Academy Projects, Research Programmes and CoEs. The Academy aims to increase funding of research infrastructures and to maintain the level of funding for Academy Projects, Centres of Excellence and research programmes.

Interviewees were very clear about the amount of funding available for research infrastructures: it is not enough. Researchers are concerned about the current level of research infrastructures in Finland and are not optimistic about the future.

#### 4.11.2 Analysis at the level of the universities

Figure 32 shows the number of applications received from and granted to research performing organisations in Finland (sorted by number of applications received). The University of Helsinki was responsible for the largest number of applications (27% of the total) and has received the largest number of grants (31%). The ranking shown in Figure 32 largely corresponds with the ranking of the institutions in terms of total budget and total FTE research staff (shown in Appendix C.3 One difference between the different rankings is the

69 From the beginning of 2010 Academy Professor and Academy Research Fellow positions as civil service ceased to exist and the persons became employees in the host organisation. All the ongoing grants were changed. In addition, due to this change additional funding was also granted e.g. for increments in salary.

University of Turku, which ranks second in number of applications received and granted, but is third in total budget and total FTE research staff, below Aalto University.

With a success rate of almost 40% the University of Helsinki is the most successful in applying for Academy grants. The only organisation with a higher success rate is the Theatre Academy (44%), which is not a typical research organisation.

According to the Academy's self-evaluation there is some variation in success rates in different funding schemes among organisations: "For example, the recipients of Academy Professor funding are almost exclusively from universities. Research institutes, on the other hand, are on average often more successful in securing funding from thematic calls where the themes are based on society's needs (e.g. research programmes and Strategic Centres) than from other calls. In these thematic calls, researchers at research institutes and universities typically apply for funding in joint consortia."

The research institutes overall have a high success rate in the Academy competitions and get about 8% of the funding. Some researchers working at government institutes under the responsibility of a ministry other than MEC said during the interviews that they feel disadvantaged compared to the universities, since both the Academy and the universities answer to MEC. They pointed out that almost all the members of the Academy Research Councils are from universities. As a result, they said that they sometimes, when drafting a proposal with a university, decide strategically to nominate a researcher from the university as principal investigator.

The researchers from these institutes are highly dependent on external funding as they have few opportunities to do research using their ministry funding. "Our ministry's money is not for research, just for the infrastructure." They feel however that they are more professionally organised than many universities and that this explains their good success rate.

#### 4.11.3 Gender balance

Figure 34 shows the ratio between women and men in the number of applications, number of granted applications and the success rate. Male scientists are responsible for on average 65% of the total number of applications received per year. 65% of the grants are also to male scientists. Similarly, female scientists, who receive 35% of the total of granted applications, send 35% of the applications. The ratio in number of applications and granted applications between men and women has not changed over the years.

Looking at the total number of applications received per year, the figure above shows a steady decrease per year. While in 2007, the Academy received 4.736 applications; in 2011 the total number of applications is 3.140 (decrease of 34%). According to the annual report 2011, the decrease from 2010 to 2011 can be explained by the implementation of a new funding scheme in 2010 (first funding allocations under this scheme were made in 2011)<sup>70</sup>. The total number of granted applications shows a decrease of 52% (in 2007 2029 funded applications versus 967 in 2011). The Academy attributes the decrease in funded applications not only to the overhaul of the funding system, but also to the adoption of the full cost model in 2009.

Overall, the total number of funded applications per year has decreased more than the total number of applications received per year, which explains the downward trend in success rates (Figure 35). In 2007 the Academy was able to grant funding to 43% of the applications. In 2011 this was only 31%, a decrease of 28%. With an increasing budget you might expect a higher percentage of granted applications instead of a decrease. However, due to the introduction of the full cost model in 2009, the sizes of the grants (in Euros) have increased quite a bit. For example, the Post doctoral Researcher grant has increased from €189k (2007) to €281k (2011).

Figure 35 shows that in most years women have a slightly higher chance of an application being

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70 Academy of Finland. Annual Report 2011

Figure 31 Gross and net success rate of competitive funding schemes (2007-2011)\*

| Personal grants                                      | Number of pre-applications (letters of intent) | Number of applications | Number of grants | Gross success rate (%)** | Net success rate (%)** |
|--|--|------------------------|------------------|--------------------------|------------------------|
| Academy Professor*                                   | 730  | 184                    | 40               | 5%                       | 45%                    |
| Academy Research Fellow                              |  | 2,452                  | 296              |                          | 12%                    |
| Postdoctoral Researcher                              |  | 3,453                  | 861              |                          | 25%                    |
| Finland distinguished professor programme (FiDiPro)* | 97   | 54                     | 22               | 23%                      | 41%                    |
| Promoting clinical research careers                  |  | 98                     | 41               |                          | 42%                    |
| Researcher mobility from Finland                     |  | 614                    | 418              |                          | 68%                    |
| Researcher mobility to Finland                       |  | 1007                   | 828              |                          | 82%                    |
| Non-thematic projects and programmes                 |  |                        |                  |                          |                        |
| Academy Projects                                     |  | 5618                   | 1293             |                          | 23%                    |
| Centres of Excellence in Research*                   | 248  | 59                     | 38               | 15%                      | 64%                    |
| Thematic programmes                                  |  |                        |                  |                          |                        |
| Research programmes*, ***                            | 756  | 1095**                 | 352              | 47%                      | 32%                    |
| Research programmes: International coop.             |  | 90                     | 31               |                          | 34%                    |
| Targeted funding                                     |  | 564                    | 141              |                          | 25%                    |

\* Two stage calls

\*\* The gross success rate is calculated on the number of pre-applications if these systems are used, and calculated on the number of applications if no system of pre-applications is used. The net success rate is calculated using only the (final) number of applications.

\*\*\* The number of applications is higher than the number of pre-applications. At stage one each consortium sends one pre-application (letters of intent), while at stage two all consortium parties have to submit their own application.

Source: Academy of Finland

granted. This might indicate that there is no bias in the assessment procedure towards male scientists. However, when looking at the data for a number of the Academy funding schemes (Figure 36) it becomes clear that women are less successful than men in applying for an Academy Professor grant. This difference has become even more evident during the years. The Academy is aware of this selection bias. According to their self-evaluation the Academy has set the target in its Equality Plan to increasing the proportion of women among research post appointees to at least 40%. The self-evaluation also presents data on 2011: women accounted for

56% of research posts as Postdoctoral Researcher, 46% of research posts as Academy Research Fellow and 23% of research posts of Academy Professor. It seems that so far the Academy has succeeded in achieving their target except in the case of appointees to research posts as Academy Professor.

One of the Academy's declared objectives is to make science and research a more attractive career option for women and to promote women's research careers<sup>71</sup>. The Academy encourages women to ap-

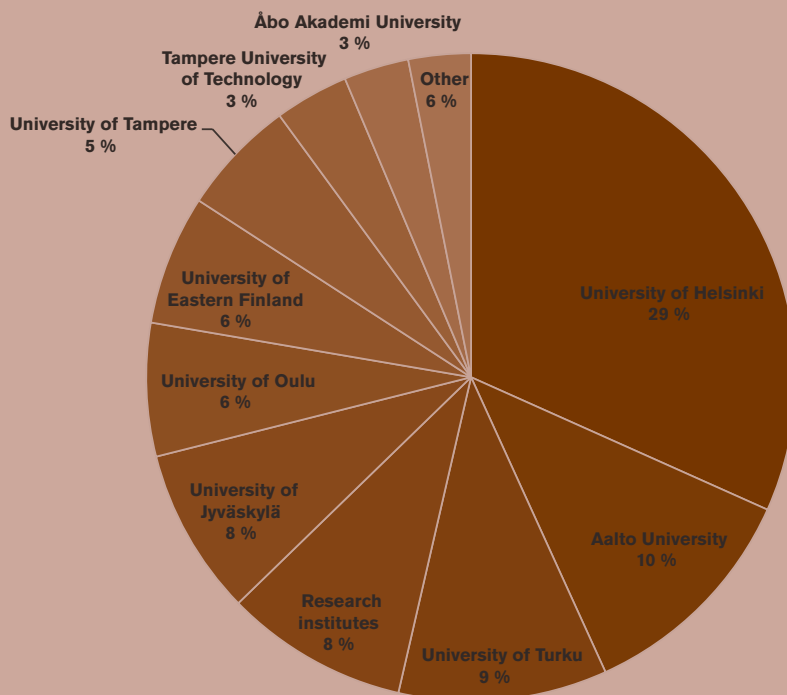
71 Academy of Finland. Equality Plan 1 January 2011 - 31 December 2013

Figure 32 Applications and success rate by institution (2007-2011)

| Research sites                        | Number of applications received | Number of granted applications | Success rate % |
|---------------------------------------|---------------------------------|--------------------------------|----------------|
| University of Helsinki                | 4,860                           | 1,931                          | 40%            |
| University of Turku                   | 2,018                           | 697                            | 35%            |
| Aalto university                      | 1,867                           | 682                            | 37%            |
| Research institutes                   | 1,621                           | 548                            | 34%            |
| University of Oulu                    | 1,569                           | 475                            | 30%            |
| University of Jyväskylä               | 1,491                           | 504                            | 34%            |
| University of eastern Finland         | 1,327                           | 418                            | 32%            |
| University of Tampere                 | 1,076                           | 394                            | 37%            |
| Tampere university of technology      | 796                             | 222                            | 28%            |
| Åbo Akademi University                | 701                             | 221                            | 32%            |
| Lappeenranta University of Technology | 268                             | 61                             | 23%            |
| University Hospitals                  | 210                             | 58                             | 28%            |
| University of Lapland                 | 121                             | 32                             | 26%            |
| University of Vaasa                   | 88                              | 30                             | 34%            |
| Hanken School of Economics            | 60                              | 17                             | 28%            |
| Sibelius Academy                      | 45                              | 14                             | 31%            |
| Theatre Academy                       | 16                              | 7                              | 44%            |
| Academy of Fine Arts                  | 8                               | 1                              | 13%            |
| <b>TOTAL</b>                          | <b>18,142</b>                   | <b>6,312</b>                   | <b>35%</b>     |

Source: Academy of Finland

Figure 33 Shares of institutions in funding granted (2007-2011)\*



\* The category 'Other' includes those universities which received less than one percent of the total funding.

Source: Academy of Finland

ply by publishing the following sentence the front page of call documents ‘We promote equality and especially encourage women to apply’. There are however no positive actions, aside from monitoring the gender balance among their peer reviewers and ensuring an equal representation of men and women in their Research Councils. The Academy is currently writing a new equality plan.

#### 4.1.1.4 Analysis at the level of the research councils

Figure 37 shows the number of applications, granted applications and success rate per research council. It shows that the Research Council for Natural Sciences and Engineering received the highest number of applications and was able to grant the highest number of projects (35% of total number of granted projects). The Research Council for Health received the smallest number of applications and was responsible for granting 16% of the total number of projects. The success rate varies only slightly among the councils, with Research Council for Health having the highest rate (39.7%) and the Research Council for Natural Sciences and Engineering having the lowest rate (37.6%). The uniformity of these success rates suggests the Academy operates a system that funds based on demand pressure.

The amount of funding allocated per research council is presented in Chapter 2.

## 4.12 Share of funding per research field

According to the Academy’s self-evaluation, the Academy funded research projects represented more than 60 research fields in 2011. Figure 38 presents the research funding allocated per cluster of science fields. We clustered the research fields of the Academy, using the Academy’s field codes classification<sup>72</sup>.

<sup>72</sup> <http://www.AoF.fi/en-GB/A/For-researchers/How-to-apply/Guidelines/Research-field-classification/>; The research field classification changed in 2011.

The greatest amount of funding is received by the cluster ‘Physical, technical and chemical sciences’ (38.2%). The humanities get the least (8.6%).

## 4.13 Age of applicants

Most researchers applying for an Academy Project are between 41 and 57 years old, with a weighted average of 48 years (Figure 39). Looking at the age distribution of applicants for the Postdoctoral Researcher it becomes clear that the most researchers apply for this grant when they are 32-33 years old. Most applicants for the Academy Research Fellow grant are between 33 and 42 years old. With regard to the Academy Professor grant: in the past researchers who have applied for this grant were between 34 to 68 years old. The highest number of applicants is between 48 and 60 years old. The weighted averages of applicants of the Postdoctoral Researcher grant, the Academy Research Fellow grant and the Academy Professor grant are respectively 35, 40 and 52 years old. The weighted averages of grantees are respectively 34, 38 and 52 years old (Figure 40). Research project grantees are on average 48 years old.

These data show that in a researchers career track, the Academy Research Fellow grant closely follows the Postdoctoral Researcher grant, but there is a wide gap between the Academy Research Fellow grant and the Academy Professor grant.

## 4.14 Outcomes and impacts

This paragraph presents the results from the survey and interviews regarding the outcomes and impacts of the Academy’s activities as a granting organisation.

Overall, interviewees were of the opinion that the Academy is good at selecting top researchers and thus being successful in the first part of its mission ‘to finance high-quality scientific research...’. The results from the interviews are confirmed by the survey. Figure 41 shows that a large majority of the respondents (and particularly the grant holders) agree with the statement that ‘The Academy selectively funds high quality research’. Most survey

Figure 34 Number of (granted) applications by gender (2007-2011)

|       | Number of applications received |     |        |     |        | Number of granted applications |     |        |     |       |
|-------|---------------------------------|-----|--------|-----|--------|--------------------------------|-----|--------|-----|-------|
|       | Male                            |     | Female |     | Total  | Male                           |     | Female |     | Total |
|       | #                               | %   | #      | %   |        | #                              | %   | #      | %   |       |
| 2007  | 3082                            | 65% | 1654   | 35% | 4,736  | 1301                           | 64% | 728    | 36% | 2029  |
| 2008  | 2681                            | 65% | 1435   | 35% | 4,116  | 1074                           | 64% | 593    | 36% | 1667  |
| 2009  | 2808                            | 66% | 1467   | 34% | 4,275  | 1024                           | 64% | 566    | 36% | 1590  |
| 2010  | 2722                            | 65% | 1455   | 35% | 4,177  | 931                            | 64% | 524    | 36% | 1455  |
| 2011  | 2070                            | 66% | 1070   | 34% | 3,140  | 642                            | 66% | 325    | 34% | 967   |
| Total | 13363                           | 65% | 7081   | 35% | 20,444 | 4972                           | 65% | 2736   | 36% | 7708  |

Academy of Finland (# = number of applications; % = percentage of total)

Figure 35 Success rates in applications (2007-2011)

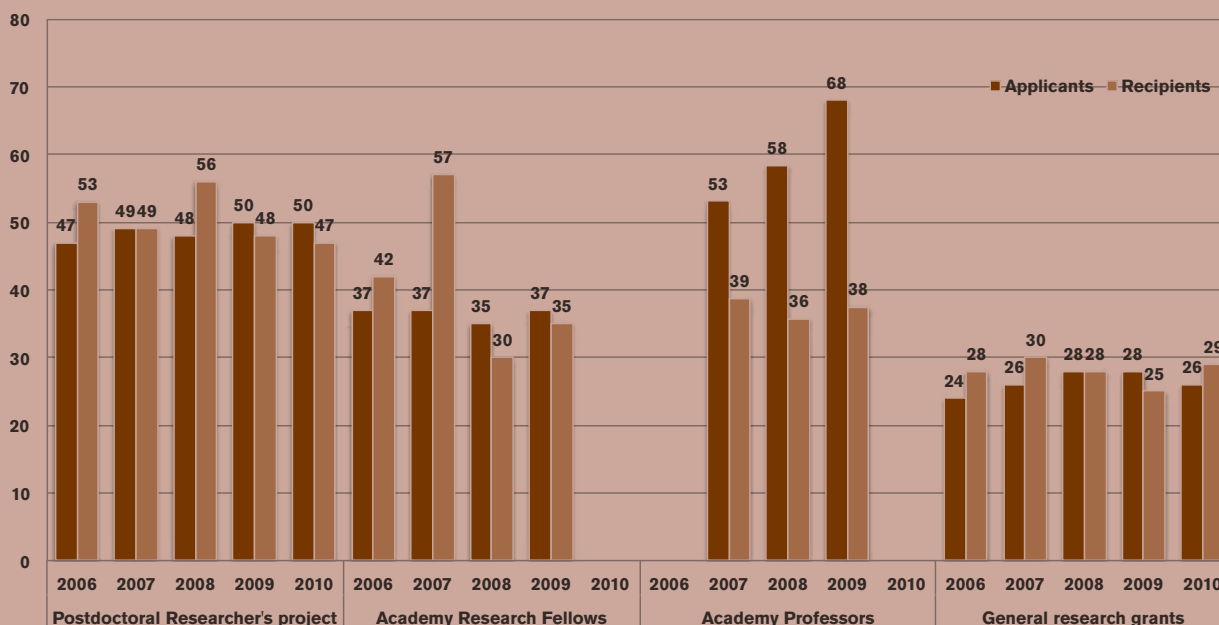
| Year  | Total | Success rate of gender (%)* |        | Success rate of total (%)** |        |
|-------|-------|-----------------------------|--------|-----------------------------|--------|
|       |       | Male                        | Female | Male                        | Female |
| 2007  | 43%   | 42%                         | 44%    | 28%                         | 15%    |
| 2008  | 41%   | 40%                         | 41%    | 26%                         | 14%    |
| 2009  | 37%   | 37%                         | 39%    | 24%                         | 13%    |
| 2010  | 35%   | 34%                         | 36%    | 22%                         | 12%    |
| 2011  | 31%   | 31%                         | 30%    | 20%                         | 10%    |
| Total | 38%   | 37%                         | 39%    | 22%                         | 13%    |

\* The success rate of gender is calculated as the percentage of the 'number of female/male funded applications' versus 'number of female/male applications received'.

\*\* The success rate of total is calculated as the percentage of 'number of female/male funded applications' versus 'total number of applications received'.

Source: Academy of Finland

Figure 36 Proportion of female applicants (2006-2010)



Source: Academy of Finland



respondents also feel that ‘The degree of competition associated with Academy grants is a driver for quality’ and that ‘The different Academy funding schemes are accepted as legitimate by the research community’.

Interviewees generally considered the Academy as reflecting rather than shaping the needs of the research community.

It became very clear from the interviews that many researchers are highly dependent on the Academy’s funding to do ‘basic’ (ie investigator-initiated) research: “There is no other funding organisation in Finland that would give money for projects based on bottom-up funding and would use scientific excellence as the criterion”. Interviewees often called upon the government to allocate more funding for basic research through the Academy and emphasise the importance of basic research for innovation.

Some interviewees criticised the Academy’s rule that its Fellows should not teach. Rather, they felt that teaching and doing research were a very fruitful combination. The Academy’s regulations on this point should therefore not be too strict.

Survey respondents were asked whether they felt that the Academy’s funding schemes contributed towards particular objectives (Figure 42). Survey responses were analysed by different age groups to assess whether the views of respondents in different career stages differ. As the table below shows, the responses from the different age groups share similar views regarding most of the statements posed. Respondents belonging to the age group ‘between 30-49 years’ were the most positive about the funding schemes – they most often agreed with the statement ‘To a large extent’ e.g. 36% of the respondents agreed to a large extent that the Academy’s schemes contribute to gaining access to state-of-the-art research facilities or more than half of them (51%) to the statement that the Academy schemes contribute to strengthening overall research capacities. The latter statement triggered the most positive responses, as 75%-85% of the respondents in the various age groups agreed completely or to a large extent that Academy schemes contribute to strengthening overall research capacities.

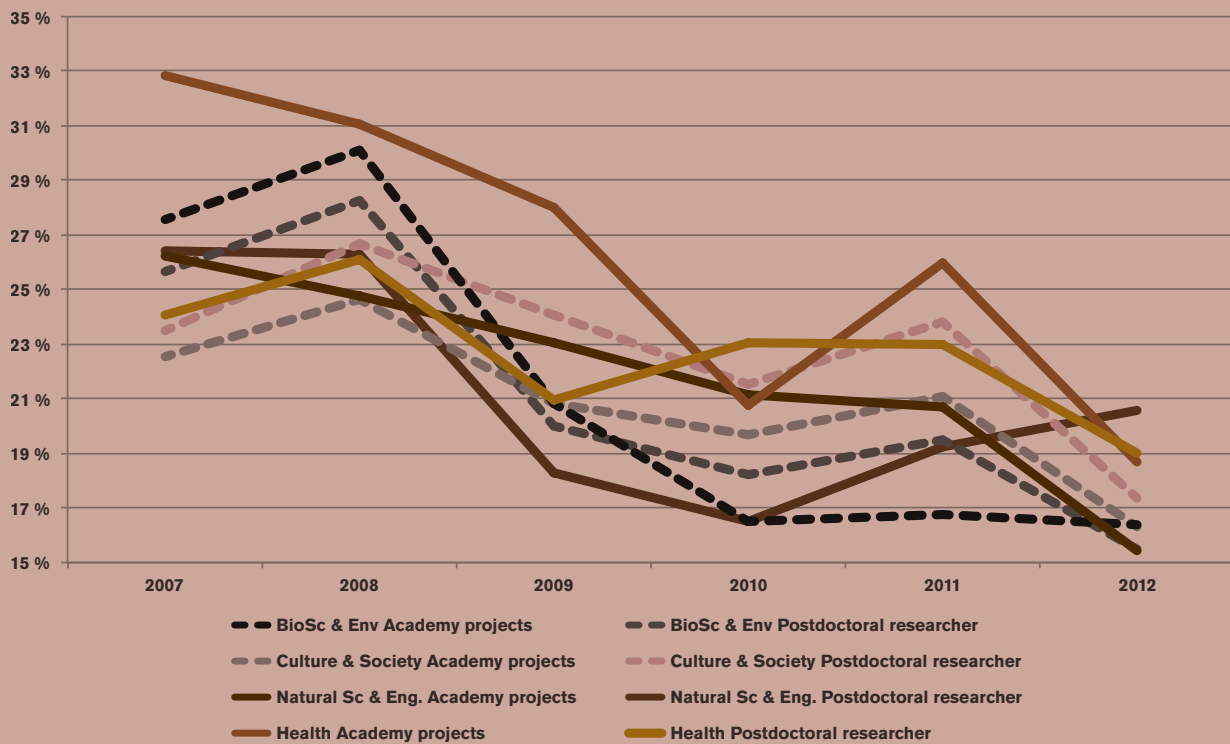
The following two questions were only asked to the grant holders. The first one related to the particular grant that the respondent was involved in. Most of the grant holders agreed fully or partly that through their project, *new research areas of significant importance for future research were explored, and that the project helped to maintain a position at the scientific forefront in their area* (Figure 43). The majority of the respondents also agreed that the project funded by the Academy has *produced/will produce novel scientific results or breakthroughs*. At the other end of the spectrum more than one fifth of the respondents disagreed that their grants contributed to carry out research with new methods or to successfully compete for international funding.

To establish whether there are any differences between the views of the grant holders of various Academy schemes, the responses were also analysed by the funding instruments. The results are presented in the table below (Figure 44), with the highest percentage per respondent group shaded. While the pattern across the different stakeholder groups is almost the same, the extent to which different grant holder groups agreed on the various features of the schemes differs slightly. For example, 90% of the Academy Research Fellows and Professors agreed that a ‘new research group was established’ as the result of their funded project, while only 43% of the Postdoctoral Researchers and 66% of the Academy Project grant holders agreed with the same statement.

The responses give a nuanced view of the usefulness of different award types. Post-docs seem to see their funding as a vehicle for establishing themselves as researchers while the Fellows and Professors saw the money more as a way to consolidate their more advanced career position. The picture with the general grants is less clear, probably because the responses reflect a variety of career situations, but they seem to be career-building and to strengthen the grant holder in internal competition.

In relation to the impact of Academy’s funding schemes, 84% of respondent stated that they agree completely or to a large extent that the Academy’s schemes contribute *towards increased prestige and career opportunities for investigators*. The proportion has been

Figure 37 Success rates for the different Research Councils between 2007-2012



Source: Technopolis, based on information received from the Academy

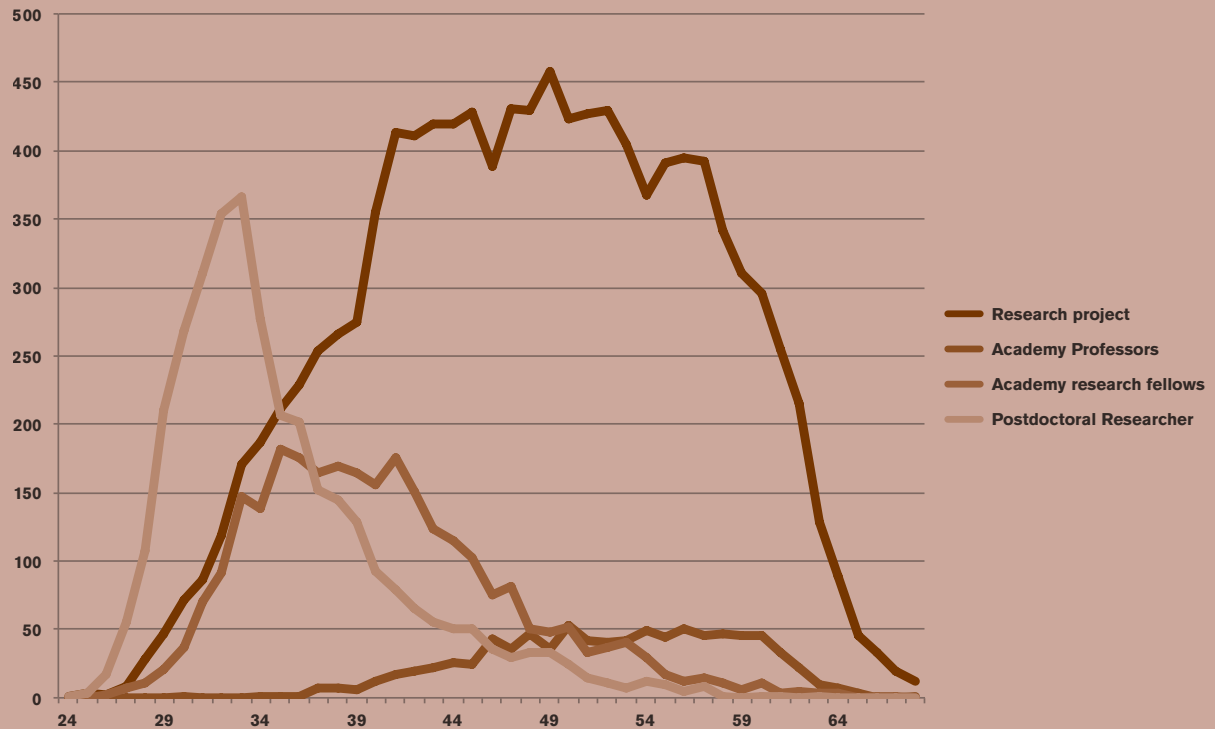
Figure 38 Research funding by field of science (2007-2011)

| Codes*  | Research fields                           | Funding           |             |
|---------|---|-------------------|-------------|
|         |   | x €1000           | % of total  |
| 1XX     | Physical, technical and chemical sciences | €575,512          | 38%         |
| 2XX-3XX | Earth and life sciences                   | €270,405          | 18%         |
| 4XX-5XX | Medical sciences                          | €274,323          | 18%         |
| 6XX     | Social sciences                           | €225,047          | 15%         |
| 7XX     | Humanities                                | €129,365          | 9%          |
| 9XX     | Not classified                            | €31,315           | 2%          |
|         | <b>Total</b>                              | <b>€1,505,967</b> | <b>100%</b> |

\* The codes in this table represents all codes in the Academy's field codes classification with the same first number.

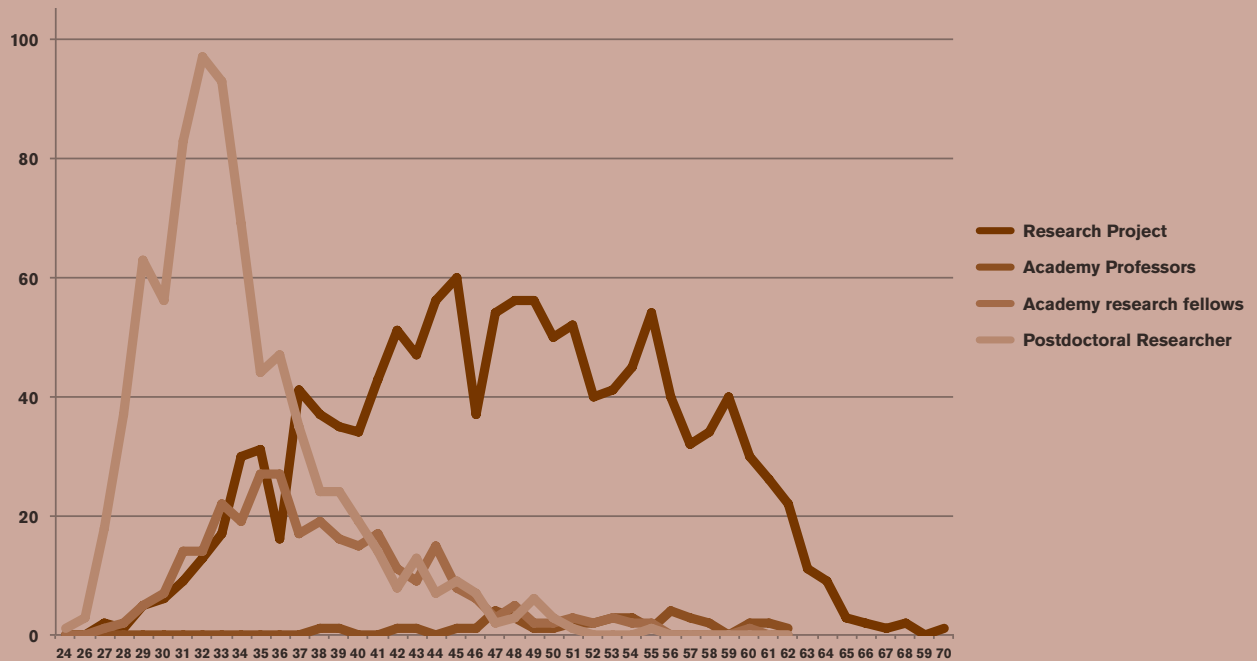
Source: Academy of Finland

Figure 39 Number of applicants by age (2007-2011)



Note: The data on Academy Professors includes the 'letters of intent'-applicants.  
Source: Academy of Finland.

Figure 40 Number of grantees per age of grantee (2007-2012)



Note: For the research projects only data from 2007-2011 is included.  
Source: Academy of Finland.

Figure 41 To what extent do you agree with the following statements regarding the selection of the Academy grants?

| Statement  | Type of respondent | Agree fully + Agree partly | Neither agree nor disagree | Disagree partly + Disagree fully | Nr. of responses |
|--|--------------------|----------------------------|----------------------------|----------------------------------|------------------|
| The Academy selectively funds high quality research  | AS                 | 72%                        | 12%                        | 12%                              | 422              |
|  | GHS                | 90%                        | 5%                         | 3%                               | 398              |
| The degree of competition associated with Academy grants is a driver for quality           | AS                 | 62%                        | 14%                        | 22%                              | 419              |
|  | GHS                | 82%                        | 9%                         | 8%                               | 397              |
| The different Academy funding schemes are accepted as legitimate by the research community | AS                 | 62%                        | 16%                        | 10%                              | 416              |
|  | GHS                | 75%                        | 12%                        | 6%                               | 399              |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 42 How far do you feel that Academy funding schemes contribute to the followings? Responses presented by age group distribution of respondents

|   | Age group of respondents | Completely | To a large extent | To some extent | Not at all | I don't know | Nr. of responses |
|---|--------------------------|------------|-------------------|----------------|------------|--------------|------------------|
| Access to state-of-the-art research facilities  | 50 years or more         | 6%         | 32%               | 41%            | 11%        | 10%          | 207              |
|   | Below 30 years           | 14%        | 29%               | 29%            | 7%         | 21%          | 14               |
|   | Between 30-49 years      | 11%        | 36%               | 34%            | 4%         | 15%          | 579              |
| Building new international scholarly networks   | 50 years or more         | 12%        | 33%               | 45%            | 7%         | 3%           | 208              |
|   | Below 30 years           | 7%         | 50%               | 36%            | -          | 7%           | 14               |
|   | Between 30-49 years      | 16%        | 36%               | 39%            | 3%         | 6%           | 578              |
| Creating critical mass with comparative advantage in given research fields                          | 50 years or more         | 16%        | 34%               | 37%            | 8%         | 5%           | 206              |
|   | Below 30 years           | -          | 43%               | 43%            | 7%         | 7%           | 14               |
|   | Between 30-49 years      | 13%        | 34%               | 33%            | 5%         | 16%          | 576              |
| Ensuring wide access to results of publically funded research through open access and dissemination | 50 years or more         | 10%        | 25%               | 44%            | 11%        | 12%          | 208              |
|   | Below 30 years           | 7%         | 21%               | 29%            | 14%        | 29%          | 14               |
|   | Between 30-49 years      | 10%        | 25%               | 35%            | 9%         | 22%          | 578              |
| Establishment of public-private partnerships across strategically important areas                   | 50 years or more         | 2%         | 6%                | 41%            | 18%        | 33%          | 205              |
|   | Below 30 years           | 7%         | 14%               | 21%            | 7%         | 50%          | 14               |
|   | Between 30-49 years      | 2%         | 12%               | 30%            | 10%        | 46%          | 576              |
| Improved employment conditions of researchers   | 50 years or more         | 15%        | 40%               | 36%            | 7%         | 1%           | 208              |
|   | Below 30 years           | 21%        | 29%               | 43%            | 7%         | -            | 14               |
|   | Between 30-49 years      | 27%        | 41%               | 26%            | 4%         | 3%           | 581              |
| Strengthening overall research capacities   | 50 years or more         | 22%        | 53%               | 21%            | 1%         | 2%           | 208              |
|   | Below 30 years           | 14%        | 71%               | 14%            | -          | -            | 14               |
|   | Between 30-49 years      | 31%        | 51%               | 14%            | -          | 3%           | 582              |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

particularly high among the Academy Fellows and Professors with 88%. A majority of these respondents also stated that the Academy's schemes have to a large extent contributed towards a *stronger internal position for applicants within their organisation, improved national visibility and attracting other sources of funding*. A third of respondents did not know whether Academy's schemes had any impact on *strengthening innovation capabilities of others outside their organisation*.

Grant holders' answers relating to a potential continuation, follow-up and use of respondents' grants and research results are presented in chart below (Figure 46). Overall grant holders are very positive about the different ways that their project will continue (through new applications, partnerships, use of knowledge, etc.)

#### 4.15 Does the Academy select the best researchers to fund?

As a complement to the evaluation a small study was conducted of the bibliometric performance of grant recipients and other Finnish researchers. Key findings were

*On the whole, Finnish publications gathered 8% more citations than publications in the world on average in 2008–2011. The publications of Academy-funded researchers had a higher relative citation impact than the publications of other researchers working in Finland across all main fields of science. The former publications gathered 21% more citations, the latter publications 3% less citations than publications in the world on average. The relative citation impact of the publications of Academy-funded researchers was above the world average across all main fields of science.*

*In Finland, 4% more publications (top 10 index 1.04) ranked among the highly-cited publications (i.e. most cited 10% of publications) than in the world on average in 2008–2011. Respectively, the number of highly-cited publications of Academy-funded researchers was 23% higher than in the world on average. The index value for the publications of other researchers was below the world average (0.88).*

#### 4.16 Evaluation at the Academy of Finland

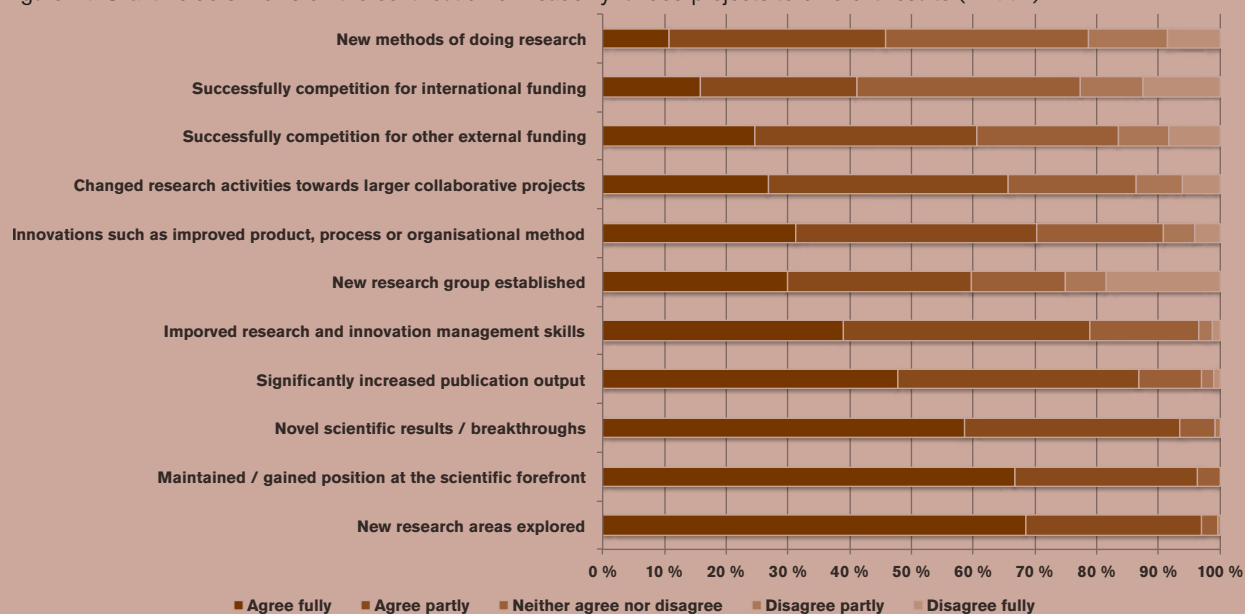
The Academy has a long established tradition of evaluating fields of science and its research programmes. We reviewed ten evaluations in each category (Figure 47), downloaded from the Academy web site.

In each case, evaluation practice is rather stable. All involve panels. These are with rare exceptions made up of foreigners, generally from outside the Nordic area. Individual groups or project leaders complete self-evaluation forms, which are provided to the panellists. Panellists read these together with sample outputs and generally make site visits before writing up their conclusions (supported by a secretary). Two of the field evaluations were supported by bibliometrics. In the other cases, the panellists had to rely on self-reported information about publications from those being evaluated.

Terms of reference are specific to the individual evaluation, so they do not always address the same questions. Variety among programme goals means that the programme evaluations are quite likely to ask varying questions, whereas issues of overall quality and development potential in fields are inherently more generic. Field evaluations are broader and involve more researchers than programme evaluations, so the panels are bigger.

The biotechnology field evaluation and strategy is unusual in that the Academy, Tekes and SITRA commissioned it jointly. It is deliberately forward looking, trying to take stock of the state of the field in Finland and to set future directions. The clinical research evaluation was organised jointly with the Swedish Science Council, covering both countries. In general, the field evaluations discuss not only the state of the field at national level but provide specific feedback to each research group in the field. They all discuss quality, normally finding it generally good and with a few spots of excellence. Occasionally, they suggest that a research programme is needed in order to develop an area further. Many of the observations are about the research system at a higher level. In the early part of the last decade, panels discussed several systems issues

Figure 43 Grant holders' views on the contribution of Academy funded projects to different results (n=382)



Source: Technopolis survey - grant holders of the Academy of Finland, Dec 2012

- Fragmentation caused by the old-fashioned, single-professor structures in the universities
- Insufficient international mobility
- The need for a tenure track system to develop a coherent university career
- Anxiety that when the graduate school programme came to an end, PhD education would fragment and potentially decline in quality
- The need for a more coherent national management of research infrastructure
- A desire that universities should own and manage IPR

The fragmentation theme continues in recent field evaluations, too, suggesting there is still room for restructuring and building more critical mass in some fields. The energy and food sciences evaluations called for thematic programming, in order to connect research to societal needs. Most did not discuss any need for programming,

The PROACT evaluation was done jointly with the funding partners, Tekes and MRNT (France). The NEURO one was done together with the National Science Foundation of China and Canada's CIHR, which were funding partners.

Programme evaluations generally tackle only the programme level – a small minority publishes feedback on individual projects. Programmes tend to address interdisciplinarity and the development of newer sub-fields. While most are complimentary about the work of the programme coordinators, they also often suggest that coordination across groups and institutions is difficult and in a number of cases therefore question whether the programme has added enough value to justify itself. To the extent that programmes are expected to achieve structural change or development across a period as short as 3-4 years, this seems unduly harsh. There are examples of follow-on programmes but it may be useful more systematically to consider the sustainability of changes induced by a programme and whether a second period of funding is needed. Quite a number of the programmes seemed to be functioning as 'PhD factories' and there was concern in one case that the lack of funding of Principal Investigators meant they were under-involved in the research.



Figure 44 Grant holders' views on the contribution of the Academy's funded projects to different achievements by funding instrument

| Nr. of responses by AKA funding scheme                                 | GHS - Academy Fellows and Professors<br>(n varies by Q from 42 to 53) |                            |                         | GHS - Post docs (n varies by Q from 75 to 117) |                            |                         | GHS - general projects (n varies by Q from 97 to 124) |                            |                         |
|--|---|----------------------------|-------------------------|--|----------------------------|-------------------------|---|----------------------------|-------------------------|
|  | Agree fully + partly  | Neither agree nor disagree | Disagree partly + fully | Agree fully + partly                           | Neither agree nor disagree | Disagree partly + fully | Agree fully + partly                                  | Neither agree nor disagree | Disagree partly + fully |
| New research areas explored  | 98%   | 2%                         | -                       | 97%  | 3%                         | -                       | 98%   | 2%                         | 1%                      |
| Improved research and innovation management skills                     | 84%   | 16%                        | -                       | 86%  | 13%                        | 1%                      | 75%   | 20%                        | 4%                      |
| New research group was established                                     | 90%   | 6%                         | 4%                      | 43%  | 15%                        | 42%                     | 66%   | 17%                        | 18%                     |
| Changed research activities towards larger collaborative projects      | 76%   | 16%                        | 8%                      | 68%  | 12%                        | 20%                     | 62%   | 28%                        | 10%                     |
| New methods of doing research  | 57%   | 27%                        | 16%                     | 49%  | 26%                        | 25%                     | 43%   | 39%                        | 18%                     |
| Novel scientific results / breakthroughs                               | 100%  | -                          | -                       | 91%  | 7%                         | 2%                      | 95%   | 5%                         | -                       |
| Maintained / gained position at the scientific forefront               | 98%   | 2%                         | -                       | 94%  | 6%                         | -                       | 98%   | 2%                         | -                       |
| Innovations such as improved product, process or organisational method | 74%   | 26%                        | -                       | 67%  | 27%                        | 6%                      | 68%   | 17%                        | 15%                     |
| The project lead to significantly increased publication output         | 92%   | 6%                         | 2%                      | 89%  | 9%                         | 2%                      | 87%   | 10%                        | 3%                      |
| Successfully competition for other external funding                    | 65%   | 15%                        | 20%                     | 65%  | 22%                        | 13%                     | 59%   | 24%                        | 17%                     |
| Successfully competition for international funding                     | 52%   | 26%                        | 21%                     | 43%  | 36%                        | 21%                     | 33%   | 41%                        | 26%                     |

Source: Technopolis surveys - grant holders of the Academy of Finland, Dec 2012

Both categories of evaluation are clearly informative and of potential use to the research-performing organisations. However, we were not able to identify a process at the Academy that puts the evaluations to systematic use.

## 4.17 International comparison

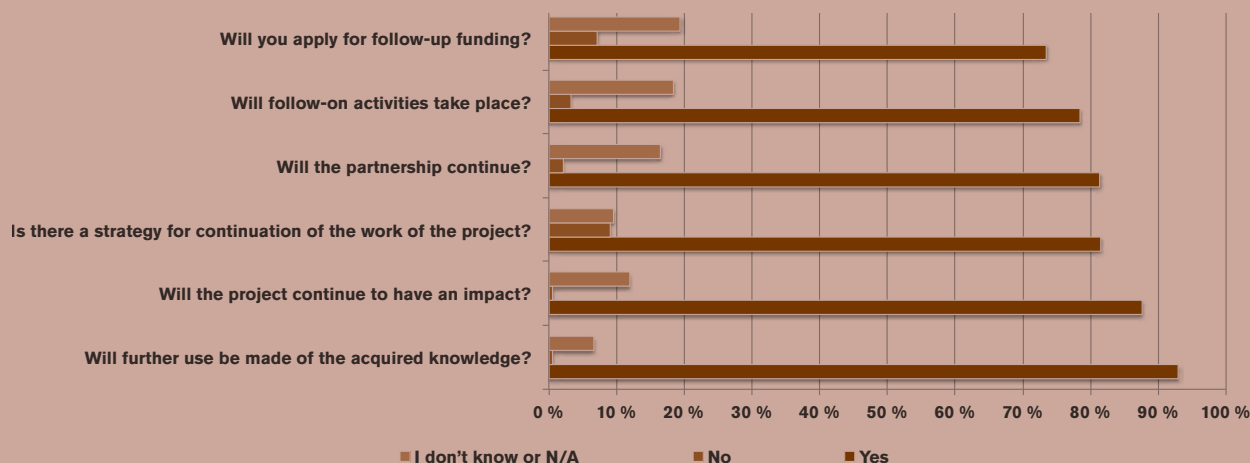
While the Swedish Research Council uses a large number of assessment panels – about 50 panels in total across the different scientific domains engaging approximately 500 peers out of which 27% were international peers in 2012 – NWO and FWF do not work with panel reviews, but with remote

Figure 45 Percentage of respondents who agreed completely or to a large extent with the following statements regarding the types of impact of the AKA funding schemes

|   | AS (n varies by Q from 405 to 415) | GHS (n varies by Q from 387 to 398) | GHS - Academy Fellows (n varies by Q from 46 to 50) | GHS - Post doc grant (n varies by Q from 124 to 126) | GHS - General project (n varies by Q from 126 to 129) | All respondents (n varies by Q from 792 to 813) |
|---|------------------------------------|-------------------------------------|---|--|---|---|
| Increased prestige and career opportunities for investigators who get funding     | 85%                                | 83%                                 | 88%   | 88%  | 81%   | 84%   |
| A stronger internal position for successful applicants within their organisations | 74%                                | 66%                                 | 68%   | 72%  | 63%   | 70%   |
| Improved national visibility  | 69%                                | 66%                                 | 76%   | 65%  | 61%   | 67%   |
| Attracting other sources of funding   | 56%                                | 47%                                 | 64%   | 56%  | 41%   | 52%   |
| Improved international standing   | 49%                                | 50%                                 | 54%   | 49%  | 49%   | 50%   |
| Improved utilisation of research results by others                                | 31%                                | 34%                                 | 39%   | 35%  | 30%   | 32%   |
| Strengthening innovation capabilities of others outside your organisation         | 22%                                | 24%                                 | 28%   | 26%  | 21%   | 23%   |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 46 Grant holders' views on continuation of their project in the future



Note: Nr of responses varies by sub-question between 376-378

Source: Technopolis survey - grant holders of the Academy of Finland, Dec 2012

peer review. They ask independent and unbiased (foreign) experts to write a report about the funding proposal on the basis of clearly described selection criteria. There are however some differences in the organisation of the peer review procedures at the two organisations.

FWF has been organising its peer review process with the involvement of solely foreign peers since 1999. As general procedures, a Reporter and an Alternate Reporter – members of FWF Board – are

assigned to every proposal, who take care of the peer selection, the review process and present the proposals together with the results of the reviews to the Board, which makes the final funding decision. There is no thematic quota system at FWF. Proposals from the different scientific areas compete with each other based on their scientific quality. There are variations in the number of reviews required across the different programmes and based on the size of project funding requested (between 2-8 reviews).

In some cases there are also juries involved in the selection (e.g. for the Wittgenstein Award). The total number of reviews requested was slightly over 14,000 in 2011 out of which just over 4,900 reviews were received.

The peer review process at FWF is run highly effectively with constant review and quality assurance built in the system. The results of these efforts are reflected in the constantly decreasing number of refusals received when reviews are requested from peers and in FWF's remarkable 4.7 months average time-to-grant indicator.

Unlike the other research councils in this benchmark, FWF also puts emphasis on the review of the final project reports. External peers assess the final reports submitted and the grant holders are invited to address the comments received, if wanted. The assessment given by the peers for the final project report becomes part of the researchers' track record. Therefore, it is taken into account at the researchers' future funding applications. FWF holds a database that includes the track records including the assessments of the final reports and the Board has access to it during the project selection procedures.

At NWO a review committee or a programme committee gives a recommendation about prioritisation of the proposals. Part of the procedure is a rebuttal from the applicant. The written reports are made available to the applicant, who has the opportunity to respond to the content of the referees' reports. The applicant usually has one week to respond to the referees' reports. The review or programme committee take this rebuttal report into account. Applicants in the Netherlands also have the possibility to lodge an appeal against the decision made by NWO. An independent advisory committee, the Appeals and Objections Committee, has been set up for this purpose. When objections were found to be grounded, NWO is obliged to provide funding to the applicant.

The evaluation panels at the Swedish Research Council meet physically and use a set of criteria and seven-grade scales to assess the novelty and originality of the proposal, the scientific quality of the proposed research, the merits of the applicant(s) and the feasibility of the project. The evaluation panels

traditionally have different cultures, and against all intentions in favour of streamlining procedures, there are still differences remaining. Once the panels spend their allocated budgets, the projects just below the cut-off line are transferred to a redistribution panel, which can decide on funding some of them. Based on the ranking set up by the evaluation panels the Scientific Councils and Committees select the projects for funding.

NWO has a more or less formalised procedure for developing thematic programmes. Before a thematic programme is launched, a temporary committee defines the scope of the programme, for example regarding (sub)themes and it also works out the modalities of the funding schemes (type of instruments and criteria). As a next step in the programming programme/evaluation committee is installed, often consisting of the same people as the temporary committee. External partners (such as ministries) are involved as required. In many cases these external partners provide additional funding for the thematic programme and they have to safeguard the societal relevance of the programme. A two-step process is almost always used in thematic programmes. The assessment of the relevance of the proposals is the main aim in the first round, while the emphasis is on scientific quality in the second round.

During the past years, there have been only minor changes in VR's programme portfolio and research funding across the themes and instruments. The Swedish Research Council does not have standard procedures for selecting programmes, but a process for prioritisation (of programmes and themes) is under development. Currently programmes can be decided by the Board, on the basis of suggestions from the Scientific Councils or by the Scientific Councils themselves, if it falls within their allocated budget. Programmes are also decided on by the Government in the research bill.

Just like its Swedish counterpart, FWF works with a rather stable programme portfolio. There have been only some minor changes over time such as the discontinuation of the some programmes, but these changes were mainly due to mergers of different programmes rather than to the creation of new

Figure 47 Evaluations reviewed

| Date/Period       | Subject                                | No of panellists | Level of aggregation   |
|-------------------|--|------------------|------------------------|
| <b>Fields</b>     |  |                  |                        |
| 2002              | Biotechnology evaluation and strategy  | 6                | Field                  |
| 2005-09           | Chemistry                              | 7                | Field and Group        |
| 2001-05           | Dentistry                              | 6                | Field and Group        |
| 2006-10           | Ecology, evolutionary biology          | 10               | Field and Group        |
| 1999-05           | Energy                                 | 8                | Field and Group        |
| 2000-04           | Food science                           | 6                | Field and Group        |
| 2010-11           | Media and Communications               | 5                | Field and Group        |
| 2007-11           | Physics                                | 8                | Field and Group        |
| <b>Programmes</b> |  |                  |                        |
| 2008-11           | WORK                                   | 4                | Programme              |
| 2007-10           | Valta (Power)                          | 3                | Programme              |
| 2002-05           | PROACT proactive computing             | 3                | Programme and projects |
| 2006-09           | NEURO neuroscience                     | 4                | Programme              |
| 2006-09           | LIKE2 Business knowledge               | 3                | Programme              |
| 2005-09           | KITARA IT in engineering               | 3                | Programme              |
| 2006-10           | KETJU Sustainable chemicals production | 4                | Programme and projects |
| 2007              | ESGMO GMO research                     | 4                | Programme              |
| 2004-07           | Socara Social capital                  | 6                | Programme              |
| 2003-06           | TULE Future electronics                | 5                | Programme              |

ones. Both for VR and FWF stand-alone projects dominate the funding amounting to almost half of the total funding pool available.

## 4.18 Conclusions

Overall, the Academy is considered an efficient administrator of research funding rather than a change agent. The main conclusions regarding the Academy's role as a granting organisation are

- The Academy's current portfolio of funding instruments meets the needs of the Finnish research community. However, with regard to the Academy's support of researchers' careers, many feel that there is a funding gap between the Academy Research Fellow Grant and the Academy Professor grant. This is confirmed by the data on age of grantees, The average age of a Postdoctoral Researcher, an Academy Research Fellow and an Academy Professor grant is respectively 34, 38 and 52 years old years old, showing a gap between the two latter funding schemes
- There is some criticism from the scientific community about decision-making by the Academy on the topics of research programmes: they regard it as a political process and do not feel it is transparent
- Researchers are overall satisfied with the processes concerning the announcement of the calls, the clarity of the call and the applications process (through the online system)
- A well thought out (formal) procedure to develop thematic programmes is lacking within the Academy. There is a need for such a procedure, which should include the involvement of external stakeholders, clear criteria and maybe some (internal) incentive mechanism
- The Academy's review process is general thought to be of high quality. The use of international peers in the process contributes an unbiased and independent review. However, in the decision-making by the research councils (or in some cases steering group) other factors are taken into account, in addition to pre-defined criteria such as scientific quality, which makes this step in the review process not transparent

- There seems to be room for improvement in the funding of high-risk/high-gain research. Although there is awareness among those involved at the Academy in the funding process and several measures already have been taken, it is generally felt that supporting this type of research is not one of the Academy's strengths
- Multidisciplinary research is recognised at the Academy and assessed in joint panels. Available evidence suggests that interdisciplinary applications are not disadvantaged in the application process. However, as there is no earmarked funding for this type of research (except for the research programmes), there is a risk of a bias towards projects that fit more into the core of the research council
- The review process is generally thought to take a long time, but researchers did not feel that the Academy should compromise on the quality by speeding things up. There were some complaints about the time between decision-making and the receipt of the actual funding and the lengthy 'waiting time' for PhD students if they do not finish their PhD on time (with a maximum of 24 months)
- Researchers are satisfied with the low level of reporting that is required, as it allows them to focus on research instead of administrative obligations. It was felt however, that there is room for improvement in the flexibility of funding
- The scientific community is very unhappy with the full cost model. The feeling is that success rates have decreased, less money goes to the actual research and researchers' expenditures have become intransparent. In addition, the percentages of overhead costs differ greatly between universities for reasons that are unknown. The Academy is not happy with the system either as it has no systematic information about or control over the uses of the part of the grants that relate to indirect costs
- The Academy Professor and the Academy Research Fellow are the most competitive grants, they have exceptionally low success rates: 5 and 12%. The Academy aims to decrease funding of Postdoctoral Researchers because it believes there are too many postdocs compared to the positions available in more advanced stages of researchers' careers. Postdocs will continue to be funded through other funding schemes of the Academy
- The distribution of funding amongst the research organisations in Finland is roughly what can be expected based on ranking of universities in total budget and the total FTE research staff. The University of Helsinki is the most successful in applying for Academy grants and has received the largest share of the total funding (29%)
- There is a decrease in number of applications received. However, the decrease in number of applications granted is greater, which explains why there is a downward trend in success rates. In 2007 the Academy was able to grant funding to 43% of the applications. In 2011 this was only 30.8%, a decrease of 28%. It is likely that this is caused by the introduction of the full cost model in 2009, which led to an increase in the budgets applied for, while the overall funding budget did not show the same increase
- The ratio male/female grantees is 65%/35% which reflects the pattern of application. With regard to the success rate there appears to be no bias towards male scientists, except for the Academy Professor funding scheme
- The Research Council for Natural Sciences and Engineering received the highest number of applications and was able to grant the highest number of projects. The success rate varied slightly among the councils.
- The science fields in the cluster 'Physical, technical and chemical sciences' received the highest share of the Academy's budget (40%) and the cluster 'Humanities' the lowest (8.6%)
- The Academy is considered successful in the first part of its mission 'to finance high-quality scientific research'. Through its selection procedures the Academy is able to identify and fund high quality research
- The Academy is the most important funding organisation in Finland for 'basic' research. The majority of grant holders agrees that through the Academy's funding they have been able to explore new research areas of significant importance for future research. The funding has produced/will produce novel scientific results or breakthroughs and it helped them to maintain a position at the scientific forefront in their area. In addition, many respondents feel that the Academy's schemes contribute to increased prestige and career opportunities for investigators, a stronger internal position for applicants within their organisation and improved national visibility
- The Academy regularly evaluates fields of research and programmes. Why particular evaluations are done at particular times is not clear from the outside. Nor is the feedback loop from evaluations to Academy policy explicit. The Academy would do well to develop an explicit evaluation strategy and to integrate evaluation into its wider processes

# 5 Internationalisation

## 5.1 Introduction

Internationalisation of the Finnish Research and Innovation system has been identified as an urgent item on the policy agenda in several analyses and government reports. The Research and Innovation Guidelines for 2011 -2015 published by the RIC<sup>73</sup> states that the low level of internationalisation of the innovation system is one of its particular weaknesses.

*“Internationalisation is an objective that covers the entire system. What is needed are measures that promote the openness of our environment, genuine internationalisation in everyday life and an open-minded attitude. Internationalisation is vital because we are dependent on development elsewhere. Our own resources are limited and most of the knowledge and skills we need are produced abroad. International cooperation is also one way of improving the quality of research and innovation, eliminating duplication and bringing together domestic actors and funding for joint projects. Participating in the globalisation process and being able to influence it are in Finland’s interest.”*

The Academy of Finland emphasises the importance of internationalisation for Finland and says, for instance in its 2011 Annual Report, it is committed to giving Finnish researchers every opportunity

to engage in international mobility and collaboration with a view to increasing the quality and impact of research.

Internationalisation of research and innovation is not a goal in itself but it is an important means.

- Finland is in a relatively peripheral geographical location in Europe, which means that establishing partnerships through proximity and attracting talent to Finland face more practical hurdles than in many other locations in Europe. Thus actively supporting internationalisation could stimulate a more international culture in the Finnish (science) community.
- Bibliometric analysis shows that international co-publications have a significantly higher impact than publications with only national authors.<sup>(74)</sup> Despite the methodological shortcomings of bibliometrics as a tool to measure the quality of science, this suggests that international collaboration is related to the quality and visibility of science, as collaboration enhances quality, but possibly also through the selection of better performing researchers into international collaboration.<sup>(75)</sup>

73 The Research and Innovation Council of Finland, Research and Innovation Policy Guidelines for 2012 -2015, Helsinki, 2010, page 19.

74 Narin, F. and E.S. Whitlow. 1990. Measurement of scientific cooperation and coauthorship in CEC-related areas of science. Vol. 1. Brussels: Commission of the European Communities (EUR 12900 EN); Academy of Finland (2012), The State of Scientific Research in Finland, page 45.

75 Luukkonen, Terttu, Olle Persson, and Gunnar Sivertsen. 1992. Understanding patterns of international scientific collaboration, Science, Technology, & Human Values, 17: 101-126.



- Today important 'agenda-setting' research is conducted within international (European, global) initiatives. Taking part will be necessary in order to stay at the forefront of developments, particularly in research domains connected to broader societal challenges and industry oriented strategic research.
- Finland is too small to be world-class in all scientific domains. International cooperation could provide the opportunity to work with the best in the field and or to work with scientists with complementary knowledge, necessary to make scientific progress.

A 2009 report on the internationalisation of Finnish scientific research published by the Academy of Finland marked a significant increase in international engagement in the past few decades.<sup>76</sup> The report's main purpose was to explore how the internationalisation in the Finnish system can be best monitored.

The more recent State of Scientific Research in Finland report shows that the share of non-native research as percentage of funded researchers is growing steadily. According to this report:

*"Non-native nationalities accounted for 13% of research staff at Finnish universities (total 2,308 FTEs). The proportion of non-native researchers was highest at the earlier stages of the research career (doctoral students 17% and postdoctoral researchers 18%). In 2011, the proportion of non-native lecturers and other researchers on the third tier of the research career was 10%, among professors and equivalent 6%."*<sup>77</sup>

This report also states that there is an increasing number of non-native researchers at Finnish universities whose work is funded by the Academy of Finland. The proportion of non-native researchers who have received research career funding has increased from 10% in 2008 to 15% in 2011. Growth has been fastest among researchers who have been awarded an Academy Research Fellowship, for which competition is fierce: in 2008 10% of researchers who were awarded funding for an Academy Research Fellow-

ship were from outside Finland. In just four years, the proportion had risen to over 20% in 2011.<sup>78</sup> Thus, in the last decade there has been a positive trend in the internationalisation of the Finnish science community.

A similar positive trend in terms of internationalisation can be found in publications. International co-publication has increased significantly in Finland over the past 20 years. In the early 1990s, only one in four Finnish publications involved researchers from other countries. By the turn of the millennium, the proportion had risen to 40% and in 2006–2009 almost one-half (49%) of Finnish publications were the result of international collaboration.<sup>79</sup>

The 2012 State of Science in Finland report nuances this picture for the four disciplinary areas of the Academy. While health research and biosciences are said to have high levels of international engagement, the report observes a greater need to increase international engagement in the natural sciences and engineering as well as in cultural and social research. The report sees a need for intensified international mobility and recruitment across all four domains.

To what extent the positive trends can be attributed to specific policies or instruments from the Finnish government and the Academy of Finland will be difficult to establish. The internationalisation of research and particularly basic science is a global phenomenon and has become common in most scientific disciplines. In addition in some fields such as physics, international collaboration and mobility has been normal practice for decades. For the purpose of this evaluation we will look more closely to see whether we can see direct effects from Academy actions and programmes for internationalisation in the following paragraphs.

## 5.2 International strategy

In 2007 the Academy of Finland published its International Strategy for 2007-2015. According to this strategy paper the Academy is committed to opening

76 Ahonen, Paavo-Petri, Mari Hjelt, Erkki Kaukonen and Pia Vuolanto, *Internationalisation of Finnish Scientific Research*, Publications of the Academy of Finland 7/09, Helsinki 2009.

77 Academy of Finland, (2012) *State of Scientific Research in Finland*, Helsinki, 2012, page 38

78 *ibid*, page 40

79 *Ibid*, page 45

opportunities for international research collaborations and to promoting the mobility of researchers and also to support Finnish researchers to successfully compete for international research funding. Yet another aim is to develop the research environments to be more attractive and increase the chances of foreign researchers to work in Finland. *“The Academy aims at close international funding cooperation with leading science countries both within and outside Europe, and its cooperation with emerging science countries is seen as mutually beneficial”*.

The International Strategy 2007 -2015<sup>(80)</sup>, a two-page document, describes six means of achieving greater levels of internationalisation of the science system.

1. Evaluation and monitoring of scientific quality; international peer review will raise standards of Finnish science research and thus make it more internationally competitive
2. Attractive research environments; through the Centres of Excellence and SHOK funding a better climate for research and research cooperation will also secure more international funding and attract foreign researchers
3. Internationalisation of research programmes; Particularly ERA-Nets are mentioned as a mechanism for this
4. Internationalisation of the research career; in cooperation with the universities the Academy is looking to support researchers' career mobility, particularly at the post-doctoral stage
5. Visibility of Science which includes a number of general aims to promote the global visibility of Finnish science and scientists, amongst other things through international fora and organisations
6. The Academy's role in science policy through strategic partnerships, an active role in the EU as well as at the Nordic and global arenas

The strategy document states that the Academy's Research Councils make their own priorities and strategic choices concerning their international activities.

With regard to European activities the Strategy paper states that: *“the Academy contributes to those ERA-NETs that benefit Finnish research, that support the Academy's strategic objectives and that promote the develop-*

*ment and inter- nationalisation of Finnish and European research. The Academy carefully weighs the advantages of participation in ERA- NETs and avoids overlap in the start-up of national and international programmes.*

### 5.3 The position of internationalisation in the Academy

While the 2007 strategy was intended to cover the period 2007 -2015, the Academy at the moment has no dedicated internationalisation strategy but plans to define a new one soon. The dedicated unit for internationalisation has been recently shut down. Most of the Academy's website pages on international support have not been updated for some years, some key pages not since 2007.

According to the self-evaluation, inward and outward mobility are supported through all instruments of the Academy. The Academy supports international and national mobility. Thus the topic has been mainstreamed throughout the organisation, with a large responsibility for initiating actions at the level of the Research Councils.

The Research Councils decide on the internationalisation activities within their programmes. Advantages of this approach are that activities are defined in close interaction with particular domains and the researchers in that domain. The disadvantages are that the information flow is poor and that there is no central prioritisation of what international collaboration actions to focus on. Particularly in the European context that has meant a widespread involvement in many ERA-NETs and all but one JPI. However, there is a horizontal group for international affairs (headed by the vice-president) and teams for ERANET, for EU-affairs, for regions and countries. These structures are quite strong according to internal interviews. The choice of priority countries is strongly influenced by the Ministry and focuses on China and Russia<sup>(81)</sup>, while earlier there was a much more widespread choice of countries. Nevertheless, the annual reports still report on a wide number of international activities and new

80 Academy of Finland, International Strategy 2007 -2015, brochure, not dated.

81 The countries arise from the current government programme, in which they are prioritised countries.

Memoranda of understanding, recently for instance with South Korea and South Africa.

Finland has a liaison office for EU R&D in Brussels based in the Finnish Embassy mostly to monitor, analyse and report on developments in EU research and innovation policy. The Academy has one representative based in this office, while the second counsellor is from Tekes.

## 5.4 Portfolio of activities and instruments

The Academy of Finland uses a large set of instruments for international collaboration. Appendix B.5 gives an overview of the instruments and programmes used from 2004 to 2011. There were nearly 60 programmes and calls in this period. Many of these initiatives are one-off bilateral calls on a particular topic with a specific foreign organisation. Participation in European activities is not included in this overview but is described in the paragraphs below.

### 5.4.1 Opening up Academy Programmes to foreign nationals

Over the years 2007-2011 the share of foreign applicants for funding from the Academy has on average been 12% and the total number of foreign applicants is on average 535 per year. In 2007 the share of Finnish applicants was 89%, which steadily dropped to 85% in 2011, thus the share of foreign applicants is increasing every year.

Figure 48 shows the ten countries from which most applicants came in that period, as well as the total from the rest of Europe and non-European countries. The top five largest countries were Russia, China, Great Britain, United States and Sweden. In total, around 70 nationalities applied for an Academy of Finland grant, showing that the international visibility of the Academy is quite widespread.

The data for 2007-2011 show an increase of Chinese, German and US applicants, and a decrease of Bulgarian, Polish and Hungarian applicants. The number of French, Spanish and Indian applicants is also increasing.

However, if we look at the nationality of awarded grantees only, the 'top five' origin countries changes to Russia, China, Great Britain, Poland and Hungary respectively. Over the whole period 2007-2011 the chances of getting a grant awarded were quite low for a Swede or a US researcher (both 33%) and much higher for a Bulgarian (80%) or Russian (68%) researcher. This is most likely due to the bilateral mobility grants in certain countries such as Bulgaria and Hungary in the earlier years of 2007 and 2008. From these two countries for instance, the number of applications and grants have dropped dramatically between 2009 and 2011.

The figure below shows the ten largest grant holding countries and the difference between the number of applications and the number of grants received. Grant holders from Russia form by far the largest group, followed, with a large margin, by Chinese researchers.

### 5.4.2 Bilateral agreements

The Academy has bilateral agreements with Chile, Brazil, India, Japan, China, the United States, South Africa, the Republic of Korea and Russia. According to the 2011 Annual Report the main focus of the Academy's international collaboration is with funding agencies that support research on a broad front in different disciplines. This collaboration is increasingly channelled through Academy research programmes, the themes for which are decided by the Academy Board. Proposals for suitable areas of funding cooperation and suitable partner countries are also submitted by Research Councils. The same annual report states that over the last ten years the Academy has engaged in international funding cooperation and has provided funding worth 54 million Euros to some 200 projects.

- Cooperation with Chile started originally with the Commission for Scientific and Technological Research (CONICYT) with a joint call for project proposals within the Sustainable Energy Research Programme.
- The Academy collaborates with the Brazilian National Council for Scientific and Technological Development (CNPq) on calls for joint project proposals.

- The Academy has memoranda of understanding (MoU) with two Indian organisations with a strong emphasis on the domain of biotechnology
- In China joint calls are launched together with the National Natural Science Foundation (NSFC), the Chinese Academy of Sciences (CAS) and the Chinese Academy of Social Sciences (CASS).
- In Japan the collaboration is with the Japan Society for the Promotion of Science (JSPS) and the Japan Science and Technology Agency (JST).
- In the Republic of Korea the Academy signed a memorandum of understanding with the National Research Foundation of Korea (NRF) in 2011
- The Academy has a collaboration with the Russian Foundation for Basic Research (RFBR) and the Russian Foundation for the Humanities (RFH).
- After years of preparation, the Academy started cooperation with South Africa in 2011. The memorandum of understanding is signed with the South African National Research Foundation (NRF)
- In its North America activities, the Academy undertook negotiations with Tekes and the US National Science Foundation (NSF) on joint collaboration. The Academy, Tekes and the NSF together founded two virtual institutes.

The general pattern of these bilateral agreements is that under an umbrella of a Memorandum of Understanding (MoU) individual calls are launched from the Research Programmes on a certain topic inviting joint projects with partners from each country, each receiving funding from their national council or agency. A typical pattern is that under each agreement, one to three joint calls are launched in a specific topic or science domain.

An example is provided of the decision making process on topics for a potential joint call together with the Chilean and Brazilian partners in the 2011 Annual Report. The Academy organised a workshop in Rio de Janeiro related to the Research Programme on Sustainable Energy. Eleven energy-sector scientists attended the workshop from Finland and several researchers from Brazil and Chile. Based on a shortlist of themes suggested by researchers from the three countries, the Academy started discussions with its Brazilian and Chilean partners regarding the announcement of joint calls in the field of sustainable energy. So the picture of the bilateral calls as an

instrument is one of decentralisation, fragmentation and also according to the interviews a lack of a clear focus and direction. No-one seems to have an overview and their effectiveness has not yet been evaluated.

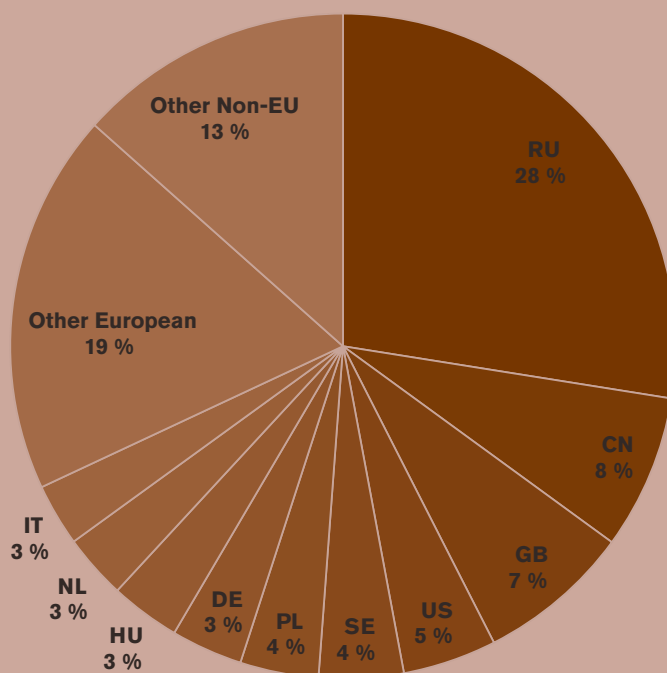
International mobility is also covered in MoUs and other S&T agreements. The number of mobility days that is supported through the bilateral programmes has dropped considerably between 2007 and 2009 but is rising again slowly. The drop can be explained by the reduction of countries included. Mobility to Finland from abroad is higher than outward mobility. While in 2007 mobility came through a wide set of Bilateral Agreements including also many European countries in 2011 this has been reduced to India, Japan, China, Germany, Taiwan, Russia and Estonia. In 2011 Japanese, Chinese, German and Russian researchers used the mobility programme.

According to internal Academy interviews, there is a strong pressure lately from the Government to focus on a limited number of strategic countries (Russia, China). Overall the decision-making process for setting up and using S&T agreements is not very transparent. Some senior researchers said that they valued collaboration closer to Finland more than for instance with Brazil, India or China. But there is no systematic evidence of this preference and it will vary considerably across scientific domains and societal challenges.

### 5.4.3 FiDiPro

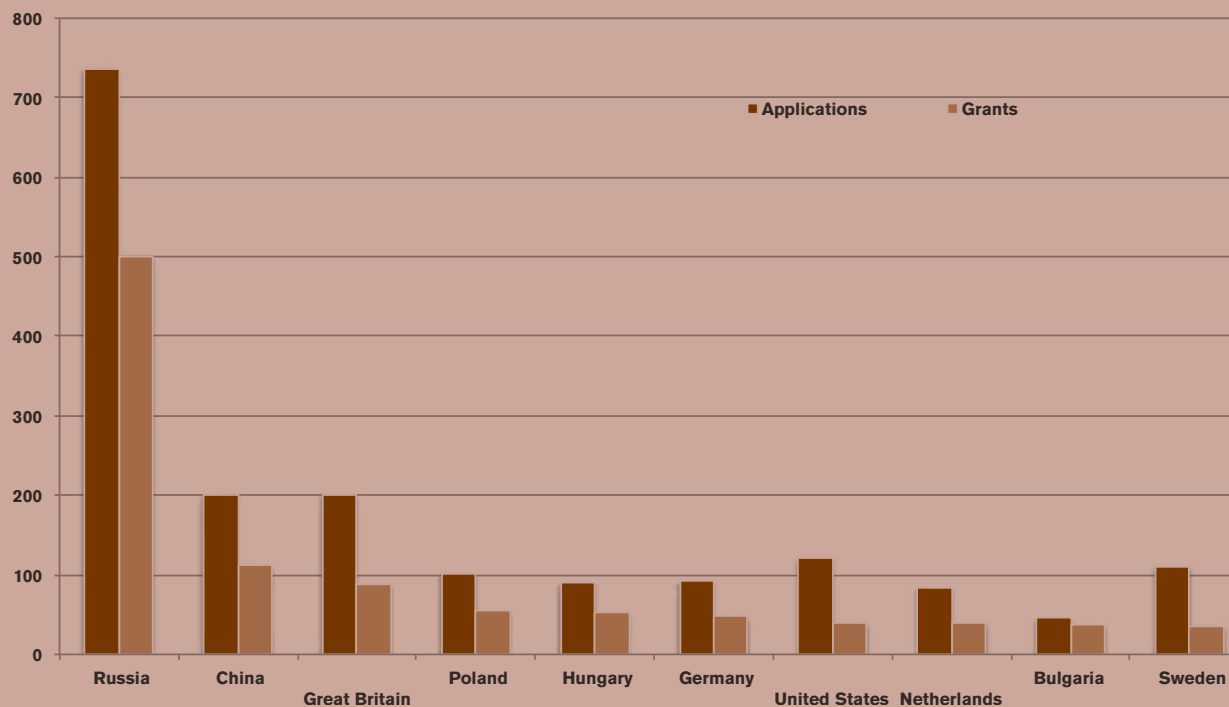
The response from interviews on FiDiPro is very mixed with some people stating it is a good programme allowing universities to attract good international researchers, while others state it has not been successful as the selection procedure does not select the very best. Anecdotal evidence from the interviews showed some successful cases in which the FiDiPro professor managed to leverage additional resources. What was said in the interviews is that success depends very much on the individual recruited and what he/she makes of their position in their university. Without a dedicated evaluation of that programme there is not enough evidence to

Figure 48 Origins of foreign applicants for Academy Funding 2007-2011



Source: Academy of Finland

Figure 49 Applications and grants from 10 most frequent nationalities of foreign grant holders (2007-2011)



Source: Academy of Finland

provide a sound judgement on the effectiveness of the FiDiPro programme.

#### 5.4.4 ERA-Nets and Joint Programming

Both Tekes and the Academy have been participating in and leading ERA-NETs. According to the Netwatch portal<sup>82</sup> Finland took and takes part in 86 networks (including Article 169/185 initiatives) and currently 28 Finnish organisations are involved in ERA networks.

Finland is involved in all but one Joint Programming Initiative (JPI). The Academy has a seat in the Management / Governing Boards of JPND (Neurodegenerative Disease Research), FACCE (Agriculture, food security and climate change), MYBL (More years, better lives), JPI Climate (Connecting Climate Knowledge for Europe), JPI Water (Water challenges) and JPI Oceans (Healthy and productive seas and oceans). The Academy has provided funding for the first calls of the JP on Neurodegenerative Diseases (JPND) and contributed €40,000 to the pilot call for JPI Facce. It is providing 18,7 person months for three years to the coordination of the JPI Water.

Currently the Academy is actively involved in 15 ERA-NETs and one horizontal policy learning ERA-NET (ERA-Learn2). Two ERA-NETs have been coordinated by the Academy: Norface and Norface Plus and BONUS. Norface and Norface Plus did research on migration, which has a social sciences background. This particular ERA-Net is often used in the EU as a good example. BONUS focuses on Baltic Sea Science and is a Network of Funding Agencies.

Thus the picture is of a widespread participation in various European initiatives (by a wide variety of Finnish actors in addition to the Academy) but a limited role in leading or coordinating any of these initiatives.

#### 5.4.5 Nordic cooperation

The Academy of Finland works in active cooperation with the Nordic countries. It is actively involved in various Nordic initiatives such as Nordforsk and the Research Councils take part in the Nordic Committees for several disciplines such as Health, Humanities and Social Sciences, Natural Sciences and Engineering. The Academy is one of the founding members of the Nordic Optical Telescope Scientific Association (NOTSA) and owns part of the NOT telescope in La Palma.

### 5.5 The views from the stakeholders

The respondents of interviews with Finnish researchers and particularly grant holders can be roughly divided into three groups:

- Those that state that in their research group / department international cooperation and internationalisation of research activities is the 'normal state of play' and has been already for a long time. These respondents typically state that they do not need AKA support for that and would rather do it on their own.
- Those that have used (a number of) international collaboration opportunities responding to the MoUs and joint calls. While having some complaints about bureaucracy and the difficulties of aligning partner support across countries, these respondents are usually satisfied.
- Those that have not used these instruments and are not very keen to engage in these collaborations or have simply not tried to get involved.

Thus interviews do not give a consistent picture of the relevance of and satisfaction with the Academy instruments. The survey of Grant Holders (GHS) and non-successful Applicants (AC) shows that international activity does not show major differences between the two groups.

Survey respondents were asked whether they have been engaged in international research projects since 2004. A large proportion of both stakeholder groups, grant holders and non-successful applicants, indicated involvement in international projects.

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82 <http://netwatch.jrc.ec.europa.eu/web/ni/network-information>



- 79% (n=323) of the non-successful applicant survey respondents have been involved in international research projects
- 81% (n=309) of the grant holder survey respondents reported international research project participation

In terms of funding source for international collaboration, there are some differences between the various groups as summarised in the following chart. Most survey respondents, 69% and 64% of the grant holder and non-successful applicant survey respondents got involved in international research projects by using funding from international funding bodies. For grant holders the second most used option seems to be Academy of Finland funding as 57% of respondents got engaged in international projects funded by the Academy, while half of the non-successful applicant survey respondents indicated involvement through funding provided by other national bodies.

Those, who have participated in any international collaboration since 2004, were asked to indicate in which types of project they were involved. The types of international projects in which respondents were involved are presented in the chart below. Framework Programme projects - excluding ERC as it was asked as a separate category – followed by other international programmes (funded by different national and international funding bodies) and Nordic projects attracted the largest numbers of participations.

To assess which types of international schemes attract participants who are more internationally oriented, the survey results were analysed based on the number of different types of international schemes in which survey respondents indicated engagement. The table below summarises the results, which should be read as follows. For example looking at the column for ERC grant: there were 80 respondents stating that they have or have had an ERC grant. Of these 80 respondents, 29 - 36% of the respondents - indicated this was their only international grant; 23 - 29% of the respondents - said they had an ERC grant and one other type of international research project (e.g. FP project); 18 – 23% of the respondents – said they had two additional types of international projects (e.g. Nordic

project and COST Action), etc. Respondents who indicated that they have or had an ERC grant, have participated on average in 2.2 international research projects since 2004.

Respondents with involvement in COST and ESF projects seem to be the most internationally oriented, with engagement in 2.45 and 2.91 different types of international schemes on average respectively.

To assess the level of survey respondents' involvement in international research projects, respondents were asked to identify their role in these projects. If referring to multiple projects, respondents were asked to select all that apply. The results are presented in the table below. Every fourth grant holder and every fifth non-successful applicant survey respondent answered that he/she has been a coordinator in an international research project, and a major role in international research projects is more common (63% of all respondents), than fulfilling a minor role (47% of all respondents). So the only major difference between grant holders and non-grant holders is their propensity to be a project coordinator. Given that being a coordinator usually gives the researchers a lead role in research agenda setting and network building this would indicate that the Academy funded researchers are in a better position in terms of international leadership in consortia.

In response to the question regarding challenges for internationalisation of research, the respondents agreed that mobility and brain drain are a problem, but there might be room for improvement in the Academy's support to international collaboration as 32% of the respondents agreed either fully or partly that the Academy's support schemes are not adequate for their needs. However, there was also a high level of uncertainty in answering the questions regarding the adequacy of Academy's support for international collaboration. For both questions, adequacy of Academy support for collaboration with partners outside the EU and for international research collaboration in a more general sense, 26% and 28% of the respondents selected neither agree nor disagree, respectively. At the same time respondents agree to a large extent that the overall benefits outweigh the costs (64% of the respondents

disagreed with the opposite statement) and mainly disagreed with the statement that international activities weaken domestic cooperation (68% of the respondents disagreed).

Although there seem to be some reservations regarding the adequacy of the Academy's support schemes for internationalisation, but in terms of international networking the majority of the respondents found that the Academy's schemes facilitate their research institutions' networking.

Furthermore, 70% of the respondents agreed that the Academy's support to international mobility helps the career development of individual researchers (Figure 55) and that the support is available at the right time in one's career (61% agreed either fully or partly). The statement with lowest level of agreement was, whether Academy support gives adequate access to international research infrastructures. Only one third of the respondents agreed to this statement, while 50% indicated either 'neither agree nor disagree' or 'I don't know or N/A' and the rest of the respondents disagreed (16%).

There was another statement that received mixed views, exploring whether Academy support makes one willing to enter international research collaboration. While almost half of the respondents agreed with this statement (48%), the statement triggered the largest proportion of disagreement among the respondents with 20% stating 'disagree fully' or 'disagree partly'. At best, this implies that the Academy's effect is indirect.

## 5.6 International comparison

NWO and FWF, like the Academy, have decided to mainstream internationalisation by integrating it in the existing funding programmes. International cooperation at the level of individuals is an organic part of the research grants awarded. In case of FWF over half of the research grants contain such provisions, which is further increased by the fact that any nationality can apply for an FWF grant. Only the place of project implementation is restricted and has to be in Austria.

The Swedish Research Council's internationalisation-related activities are driven by an International

Action Plan for the 2009-2013 period, which set targets and potential actions for the Council at the level of individuals and of the agency. In addition to embedding international mobility in the research grants as a general principle, just like NWO and FWF, VR also established a dedicated programme to foster scientific collaboration between Swedish researchers and their counterparts from low and medium income countries through the Swedish Research Links Programme.

Other important forms of international cooperation and engagement take place through participation in a number of targeted international and multinational collaborations, such as ERA-nets, Article 185 initiatives, Joint Programming Initiatives, European Technology Platforms, ESF and COST Actions. The decisions regarding involvement in such international activities are taken in different organisations. In Sweden collaboration among research funders for instance through participation in ERA-NETs, is a responsibility of the Academy of Finland, but decisions regarding involvement in joint programming initiative (JPIs) of the EU are decided at ministry level.

The grants awarded by the European Research Council influenced the international activities of the research funders in different ways. Out of the approximately 430 applicants regarded as 'excellent' in the European Research Council's first round of Starting Grants, about 300 were awarded the grant. In Sweden, the seven applicants who were rated as 'excellent' but not funded were invited to resubmit their applications to the Swedish Research Council with some adjustments to arrive at a smaller project size. These proposals were funded for a five-year term by VR. This procedure has been repeated since for other ERC calls as well.

The Austrian Science Fund has been operating the very successful START Programme providing the opportunity for young researchers to establish and build their own research group since the mid 1990's. The European Research Council's Starting Grants, which have been awarded since 2007, are very similar. In the context of the new ERC grants, FWF introduced a requirement for the START programme applicants to submit an application to

the ERC in parallel, given that they are eligible to do so. Following this, up to 2011, 27 ERC starting grants and 22 ERC advanced grants were awarded to researchers active in Austria.

FWF's bilateral scientific cooperation agreements cover a broad range of countries in each case, and are either generic, promoting networking and cooperation in general, or target specific scientific fields. Bilateral agreements signed include:

- Developing countries e.g. India or China, the latter has bilateral agreement with all three councils
- Advanced countries e.g. Germany or the UK and the USA
- Neighbouring countries to strengthen research relations e.g. FWF with Hungary and Slovenia

Furthermore, each Council runs dedicated programmes to foster internationalisation for example through promoting incoming and outwards mobility e.g. the Rubicon programme at NWO, the Meitner and Schrödinger Programmes at FWF and the international post-doc programme fostering international mobility of early stage researchers.

## 5.7 Achievement of objectives for internationalisation

So how has the Academy delivered on its own international strategy? This is assessed on the basis of the six objectives the Academy has defined in its 2007-2015 strategy paper. The six objectives were:

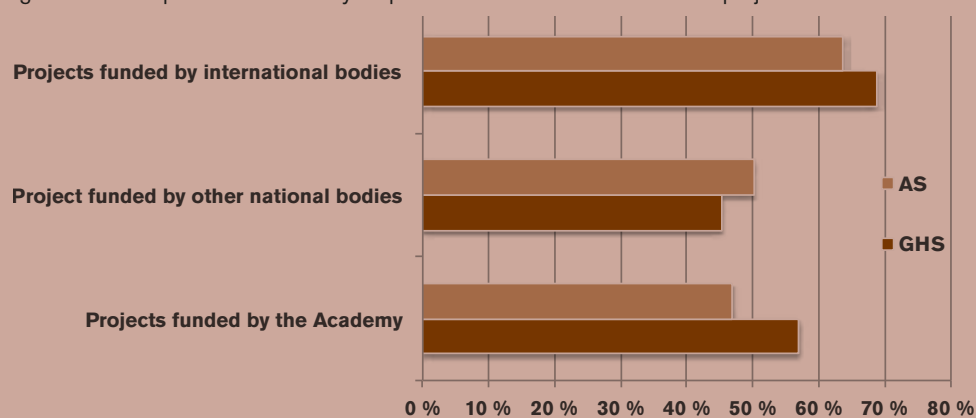
1. Evaluation and monitoring of scientific quality; international peer review will raise standards of Finnish science and research and thus make it more internationally competitive.

The Academy uses good practice international peer review processes with international peers. Its impact on the quality of Finnish science and research is difficult to establish, but it is likely that the peer review process has increased the level of competition and selection on the basis of excellence of the research proposals.

2. Attractive research environments; through the Centres of Excellence and SHOK funding a better climate for research and research cooperation will also secure more international funding and attract foreign researchers.

Available data on the international position of Finnish science are quite positive with an annually growing number of international co-publications and a larger influx of international scientists in the Finnish system. What part of this can be attributed to Academy funding is difficult to establish. The large numbers for international mobility, both inward and outward, that has been supported through various schemes is likely to have contributed considerably, as has the opening up of Finnish programmes to foreigners. The contribution of the SHOK scheme to internationalisation has not been significant, according to its recent evaluation. Overall, the situation in terms of international openness

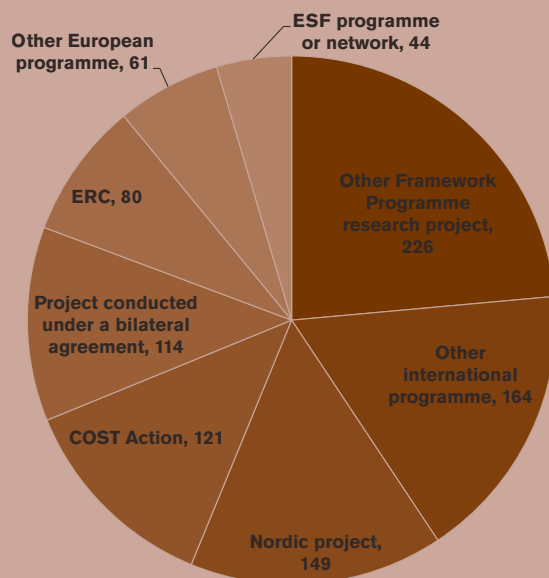
Figure 50 Participation of the survey respondents in international research projects



Note: Number. of responses varies between by sub-question: for applicants between 375-390, for grant holders between 351-374

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 51 Types of international projects in which survey participants are / have been recently engaged



Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 52 In how many different types of international project are / have survey respondents been engaged?

| Involvement in number of different international schemes | ERC grant | Other FP research project | Nordic project | Projects based on bilateral agreements | COST Actions | ESF      |
|--|-----------|---------------------------|----------------|--|--------------|----------|
| 1  | 29 (36%)  | 81 (36%)                  | 38 (26%)       | 34 (30%)                               | 20 (17%)     | 4 (9%)   |
| 2  | 23 (29%)  | 77 (34%)                  | 57 (38%)       | 39 (34%)                               | 53 (44%)     | 16 (36%) |
| 3  | 18 (23%)  | 42 (19%)                  | 31 (21%)       | 23 (20%)                               | 29 (24%)     | 13 (30%) |
| 4  | 5 (6%)    | 19 (8%)                   | 15 (10%)       | 10 (9%)                                | 13 (11%)     | 5 (11%)  |
| 5  | 2 (3%)    | 4 (2%)                    | 5 (3%)         | 6 (5%)                                 | 4 (3%)       | 3 (7%)   |
| 6  | 3 (4%)    | 3 (1%)                    | 3 (2%)         | 2 (2%)                                 | 2 (2%)       | 3 (7%)   |
| Average  | 2.21      | 2.1                       | 2.34           | 2.31                                   | 2.45         | 2.91     |
| Nr. of respondents                                       | 80        | 226                       | 149            | 114                                    | 121          | 44       |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 53 Role of participants in the international projects, normalised against the number of respondents

|                                     | GHS       | AS        | All respondents |
|-------------------------------------|-----------|-----------|-----------------|
| Project coordinator                 | 75 (26%)  | 63 (20%)  | 138 (23%)       |
| Project participant with major role | 179 (62%) | 196 (63%) | 375 (63%)       |
| Project participant with minor role | 132 (46%) | 149 (48%) | 281 (47%)       |
| No. of responses                    | 401       | 408       | 809             |
| No. of respondents                  | 287       | 310       | 597             |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

and international quality standards in Finnish science has improved since 2004.

3. Internationalisation of research programmes; Particularly ERA-Nets are mentioned as a mechanism for this.

The overview in this chapter shows that the Academy has launched many calls for internationalisation from its own research programmes and has taken part in multiple ERA-Nets and Joint Programming activities. The overview however shows that many of these activities are one-off calls in a particular domain with a particular country. The number of S&T agreements with other countries is quite substantial and while there has been some reduction in the active implementation of these agreements, the choice of countries, institutions and calls lacks a clear, overall logic. The Academy, the Research Councils nor its funders have made a clear choice about the type of S&T collaboration or the geographical focus of its international partnerships, above and beyond the government's new focus on China and Russia. Thus the result is that the instruments are likely to have funded one-off cross-border projects, but not sustainable and lasting partnerships between Finnish researchers and institutions and foreign counterparts. The lack of a clear strategy for internationalisation and the decentralised implementation of S&T internationalisation hampers its effectiveness. As the outcomes and results of these programmes are not evaluated robust empirical evidence is lacking to make a sound judgement about performance.

4. Internationalisation of the research career; in cooperation with the universities the Academy is looking to support the researchers career mobility in particular in the post-doctoral stage.

The Graduate Schools previously selected by the Academy have certainly provided more incentives for post-docs to engage in international collaboration and to be more internationally mobile (e.g. grants for foreign conferences). Interviewees however have expressed the fear that with the loss of responsibility of the Academy for the Graduate Schools, this type of support might disappear or be reduced and be the first to be cut back when university resources are under pressure. The relatively long time to degree of PhD students could be shortened

considerably, which would make the Finnish system more compatible with international practices and thus affect the number of incoming foreign PhD students. This is beyond the control of the Academy at this moment, but a consideration to be taken into account by Finnish policy makers.

5. Visibility of science, which includes a number of general aims to promote the global visibility of Finnish science and scientists, amongst others through the promotion of this with international fora and organisations.

We have not found sufficient tangible evidence to assess whether the Academy has really made a difference on this topic. Visibility of science as such is difficult to measure and its impact on raising the attractiveness of the Finnish science system even more so.

6. The Academy's role in science policy through strategic partnerships, an active role in the EU as well as at the Nordic and global arenas.

The Academy has been active on the international arena but this role seems to have been dispersed over many instruments, initiatives, policy fora and thematic areas.

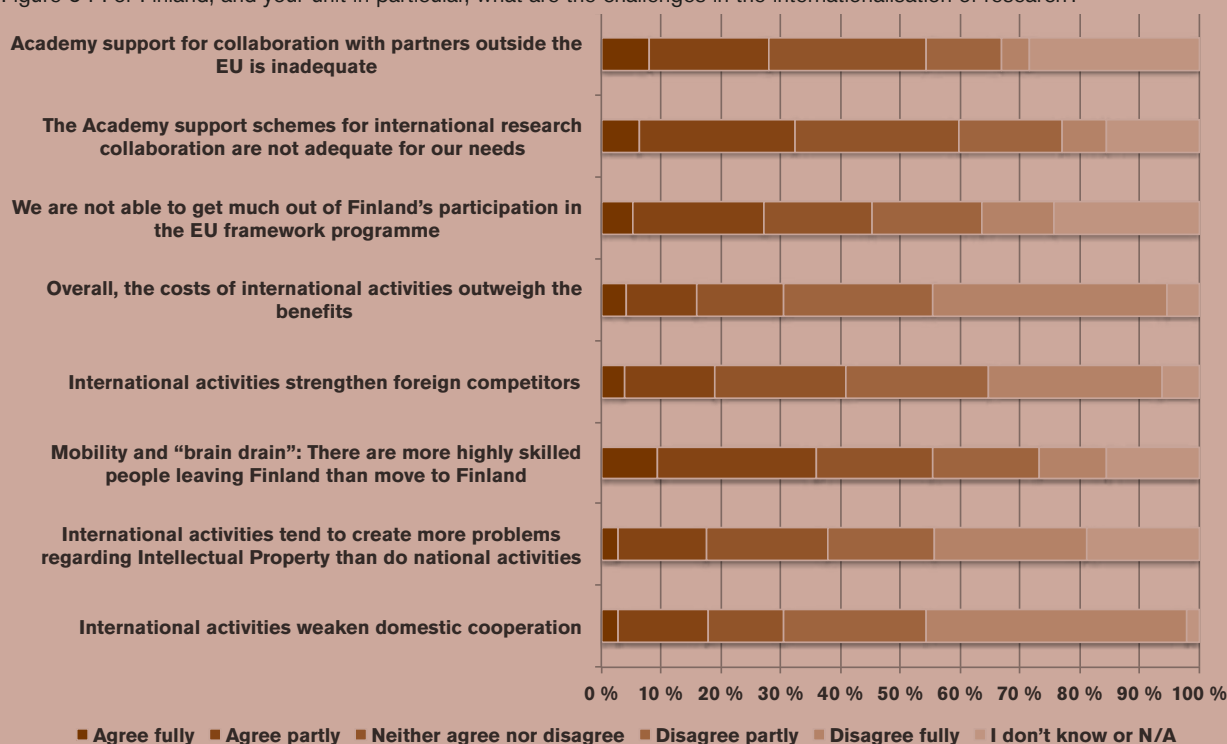
In summary, the Academy internationalisation strategy - which according to interviews is not currently in operation any longer - was mostly phrased in quite general terms, with limited elaboration of the prevailing objectives, the focus for internationalisation of science and the exact role of the Academy within the wider context of the Finnish science system.

## 5.8 Conclusions on internationalisation in the Academy

Overall there are a number of positive trends to be reported, where the Academy has also contributed to positive effects.

- There is an increasing number of non-native researchers at Finnish universities whose work is funded by the Academy of Finland
- International co-publishing has increased significantly in Finland over the past 20 years particularly in a number of scientific domains

Figure 54 For Finland, and your unit in particular, what are the challenges in the internationalisation of research?



Note: Number of responses varies by sub-question between 768-774

Source: Technopolis survey - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 55 To what extent do you agree that Academy funds facilitate the international networking needed for your research institution?

| Type of respondent | Agree fully + Agree partly | Neither agree nor disagree | Disagree partly + Disagree fully | Nr. of responses |
|--------------------|----------------------------|----------------------------|----------------------------------|------------------|
| AS                 | 61%                        | 16%                        | 15%                              | 403              |
| GHS                | 76%                        | 14%                        | 7%                               | 388              |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

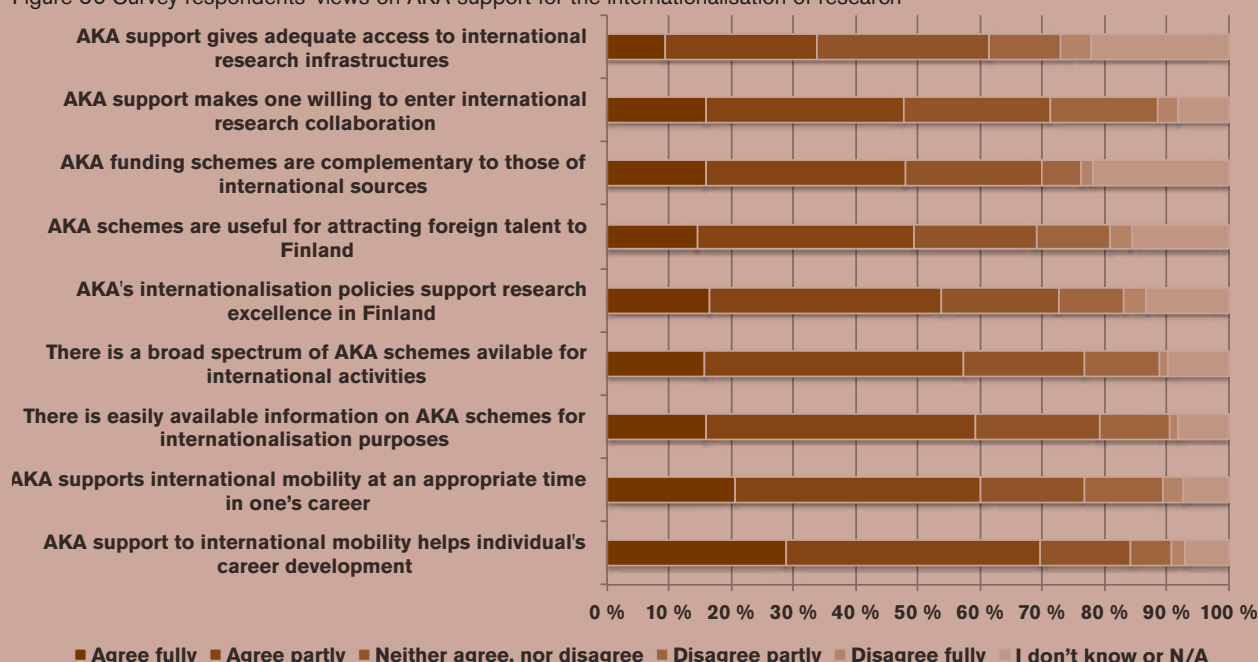
- The Academy has increased the number of schemes and initiatives for internationalisation (through collaboration and mobility) considerably.
- The survey of researchers gave a mostly positive view on the Academy's internationalisation support mechanisms

The exact impact of the Academy on the first two positive trends is difficult to establish and to isolate from a more general trend of increased international mobility in science and the requirement to have international experience as a cornerstone of research career development.

Nevertheless, the lack of a clear internationalisation strategy, the decentralised approach to internationalisation within the Academy, the abolition of the central international unit and thus the small number of FTEs dedicated to internationalisation are all indications that the Academy is not taking a strong strategic position for the Finnish research community in European and global circles. This picture could be different for different thematic domains, but overall a clear lead position to represent Finnish science seems to be missing.



Figure 56 Survey respondents' views on AKA support for the internationalisation of research



Note: number of responses varies by sub-question between 766-774

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

The incentives and instruments provided for international collaboration and mobility do not seem to have a clear focus and continuity in order to establish strategic relationships in domains where Finnish science has a comparative international strength.

The decentralised organisation of S&T internationalisation also hampers Finland's presence in international and particularly European research policy and agenda setting fora. This is not only a task for the Academy but a joint task for the main actors involved in designing and implementing Finnish research and innovation policy.

European S&T policy has moved from purely funding science and research projects to a policy arena where strategic research programming together with the Member States is taking place. Joint Programming is only one of the examples of such a shift. While supporting internationalisation mainly through individual project and researcher programmes was appropriate for many years, today the international S&T arena needs a much more

strategic approach. In light of diminishing national budgets, the opening of the global arena to more S&T players and emerging global societal challenges, more selectivity and prioritisation of S&T activities is necessary.

At best Finland and the Academy are reliable partners taking part in many international activities, but not necessarily taking a leading position in certain domains where Finland has relative strengths.

Without a strong Ministry which funds scientific research and with considerable resources and capacity to develop a science policy complemented with an S&T internationalisation strategy, a pro-active and strategic role of Finnish institutions is made much more difficult. From the outside (potential partner countries or agencies) the counterpart for potential collaboration in Finland is also difficult to identify.

The Finnish ministries responsible for (international) research and innovation (Ministry for Education and Culture, Ministry for Employment and the Economy and other relevant domain ministries) should develop a coherent and transparent support

and policy advice system for the Finnish research and innovation community, eventually via the RIC.

Research and innovation are closely interlinked and Horizon 2020 aims to close the gap between research and innovation. In addition there is a European and global trend that societal challenges increasingly shape the international research policy agendas. In this context Finland's approach to European and global research networks is not an issue that can be solely tackled from one Ministry or one research organisation such as the Academy. For small countries like Finland it becomes more and more difficult to resource the large number of international collaboration activities, which generally require a great deal of coordination effort. Thus a coherent Finnish support system should

- Distinguish between support and information to (potential applicants) on the one hand and strategic positioning on the other hand
- Define a number of priority areas for proactive intervention
- Establish a clear division of labour between institutions and set up a coordination node in order to establish transparency of information flows

The Academy of Finland should develop a dedicated internationalisation strategy with a clear and focused agenda. This would include:

- A set of overall criteria and objectives to prioritise S&T internationalisation activities across all research councils on the basis of a SWOT analysis of the Finnish science system and its most urgent needs in terms of transnational mobility, international science collaboration, access to research infrastructures and so on;
- A clear choice of domains, geographies and instruments, while also maintaining generic schemes to support inward and outward mobility
- The design of an effective and efficient set up of the internationalisation function both within the Academy and as a linchpin for the Finnish and international networks

This strategy would need to be communicated clearly to the stakeholder community.

## 6 Conclusions and recommendations

### 6.1 The context

Few things – and certainly not an organisation as significant as the Academy of Finland – can be evaluated without taking into account their context. The Academy has developed in a specific location, culture and history. Its relevance and effectiveness depend on the division of labour with other parts of the research and innovation system and the way other organisations have co-evolved.

Over the last decades, the Academy and its parent ministry have together functioned as one of the two ‘pillars’ in an internationally much admired (and imitated) research and innovation funding system. The other is Tekes and its own parent ministry. The two pillars can be thought of as helping to support science on the one hand and industry on the other. The ministries that represent the interests of other sectors of society are not directly involved in these two big funding streams, though the RIC and its predecessors have played important roles in trying to bring together the wider set of interests in research and innovation at the national level.

Despite its name, the Academy of Finland functions in international terms as an umbrella ‘research council’ and has a form of organisation that is well within the norm for research councils worldwide.

Arie Rip<sup>(83)</sup> teasingly but perceptively describes research councils as ‘aggregation machines’. They apply good process to a stream of incoming research proposals and responsively funds the ‘best’. The result is that the projects funded tend to reflect the pattern of demand in terms of disciplines, themes, gender balance, regional mix and so on. In reality, most research councils are primarily aggregation machines but build in some change agency in the form of grants for young researchers (to prevent the established players with long track records from getting all the money) and centres of excellence to build critical mass and counter tendencies to fragmentation in the research community.

The logic of the industrial pillar is different. Sweden set up a new innovation agency (Styrelsen för Teknisk Utveckling – STU) 1968 to combat the stagnation in national research identified by an OECD review of Swedish science policy in 1964. STU pointed out that Sweden needed the conventional research councils to fund bottom-up research and foster excellence across a very wide range of disciplines in order to keep the university teachers current, make sure the foreigners could not fool the Swedes and to ensure that any field that proved promising could quickly be expanded, based on the human capital already in place.

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83 Arie Rip, ‘Higher forms of nonsense’, *European Review*, 8(4), 2000, 467–485

STU saw its own role as a ‘change agent’ funding research activity in the parts of the system that underpinned industrial needs – connecting non-academic actors like the major companies with the academic research community and making sure that enough knowledge and people were generated in the areas of contact between the scientific and industrial systems. In Finland, Tekes – which was originally based on the design of STU – has traditionally played the innovation and change agency role. In order to become a change agent, STU had to abandon the dominance of the research community in its governance and empower the administration to take funding decisions (based on expert advice, where necessary) as Tekes does today. Such agencies tend to be rather technocratically steered in line with national policy; their beneficiaries have a role, but not a deciding one, in their governance.

Like other research councils, the Academy relies on the research community to allocate funding. The price of its involvement is a major role in governance<sup>84</sup> and a degree of ambiguity about whether the Academy ‘represents’ the research community or is an agent of the Ministry of Education and Culture.

This difference in governance has important implications for how the two pillars behave. The strong role of the research community in the Academy’s governance appears to have limited its willingness and ability to change. Tekes, on the other hand, has been steered by its ministry increasingly towards entrepreneurship and away from its traditional technology programmes. Many people – ourselves included – argue that this has caused a ‘gap’ that risks under-funding certain kinds of applied research as well as ‘strategic basic’ or Pasteur’s Quadrant research.

However, the two-pillar model is also challenged from another direction. Driven by a growing perception of the urgency of tackling ‘grand challenges’ such as climate change, ageing population and HIV/

AIDS, which are not so inherently industrial in character but involve or affect very many sectors of society, research and innovation funding systems have to adjust. Many more actors (not least the ministries outside the ‘two pillars’) have to be involved in overall priority setting and coordination. This is a major challenge for the design of governance systems that is reflected at European level in the preparation of the new Framework Programme ‘Horizon 2020’ and in Finland by the agenda to reform the funding and organisation of the government research institutes.

In our understanding, then, this evaluation of the Academy is taking place at a time when changes in the structure of the research and innovation funding and governance systems need urgently to be considered.

## 6.2 The Academy

The Academy is in many ways an attractive organisation and it has a distinct role in the Finnish research and innovation system. It is the most important funding organisation in Finland for ‘basic’ research. Its (current) portfolio of funding instruments meets the expressed needs of the Finnish research community and enables Finnish researchers to explore new research areas of significant importance and has undoubtedly contributed to the production of novel scientific results or breakthroughs. The Academy’s schemes contribute to prestige and career opportunities, stronger internal positions for grant holders within their organisation and improved national visibility. The Academy is considered successful in the first part of its mission ‘to finance high-quality scientific research’.

The Academy is also a very effective organisation. Its review process is generally thought to be of high quality. Through its selection procedures the Academy is able to identify and fund high quality research. Academy-funded researchers perform better in bibliometric terms than other Finnish researchers. Researchers are satisfied overall with the processes concerning the announcement of the calls, the clarity of the call and the applications process. Further, they perceive that highly competent and well-respected people run the Academy. It has

84 Dietmar Braun, ‘Who governs intermediary agencies? Principal-agent relations in research policymaking,’ *Journal of Public Policy*, 13 (2), 1993, pp135 – 162; T. Luukkonen, *Study of National Research Councils: The Impact of the ERC on National Funding Bodies*. 2012. <http://www.eurecia-erc.net/resource-centre/official-documents/>

the trust of the community in general. It intelligently explores ways to improve its processes and operates at a level of good international practice. Last but not least the Academy is in international comparison a very efficient funding agency that imposes only a low level of administration on researchers. The Academy could be considered to be a good ‘aggregation machine’.

A key policy question for the Academy is how much it should continue to be an aggregation machine and how much change agency it should undertake. It already acts as a structural change agent through funding larger projects and centres of excellence. But it rarely crosses the boundary into thematic prioritisation, and then only for short programmes.

Several things in the context mean that we need to question the Academy’s current position. First, the processes of Europeanisation and globalisation force (especially smaller) countries to consider critical mass and the need for specialisation. Second, the policy shift towards grand challenges demands thematic prioritisation, as do aspects of national industrial specialisation and policy. Third, the apparent shift in the mode of production of knowledge to an increased share of Mode 2 (multi- and interdisciplinary research that is ‘problem focused’)<sup>85</sup> needs to be accommodated in the research funding system (even if it does not follow that we should abandon Mode 1: investigator-initiated and discipline-based research). Fourth, changes in the roles of other organisations in the Finnish funding and support system may mean there is a need to adjust the boundary between what the Academy does and what others do.

The Academy has in important respects stayed the same in a changing world. The role of Tekes has changed; the role of the government research institutes is being questioned. It is not clear that the boundary between the Academy and the other parts of the system is still in the right place. In particular, it has (for locally good reasons) been reluctant

explicitly to move into Pasteur’s Quadrant<sup>86</sup> funding in relation to the SHOKs and the proposed extension of its role into funding strategic research at the institutes amounts to a similar criticism.

It is noteworthy that the Academy was able to act in a coordinated way with other agencies – notably Tekes – during the time of the Additional Appropriation for R&D of the late 1990s, when it ran a number of Pasteur’s Quadrant programmes in parallel with Tekes’ more applied ones. For example, it operated the Teletronics programme in parallel with Tekes’ TLX and ELX programmes in telecommunications and microelectronics.<sup>87</sup>

There is a clear need to tackle the problem of funding strategic and challenge-driven research. This need is bigger than – but could include – the discussion about providing strategic funding to the state research institutes. Clearly, if this function is to include the proposed shift of funding from the institute budgets to the Academy, that part should be ring-fenced for the institute, otherwise a proposal intended to strengthen the institutes will end up weakening them.<sup>88</sup> The strategic research funding within the Academy would include activities related to use-oriented research.

The new role of the Academy would have consequences for its operations, including the adoption of new methods to design research programmes in interaction with (societal) stakeholders, hiring staff with other competences, and so on. There are different potential solutions to the need for a strategic research funding and coordination of such research efforts across research sectors and ministerial responsibilities. Whatever the selected option, there is

85 Michael Gibbons, Camilla Limoges, Helga Nowotny, Schwartzman, S., Scott P. and Trow, M., *The New Production of Knowledge*, London: Sage, 1994

86 Donald Stokes, *Pasteur’s Quadrant: Basic Science and Technological Innovation*, Washington DC: The Brookings Institution, 1997

87 Erik Arnold, Terttu Luukkonen, Leonhard Joerg, Juha Oksanen, Ben Thuriaux and Shaun Whitehouse, *Evaluation of Finnish R&D Programmes in the Field of Electronics and Communications (ETX, TLX and Teletronics)*, Technology Programme Report 2/2002, Helsinki: Tekes, 2002

88 It is also important to highlight that strategic research is not the same as studies and fact-finding on topical issues related to the government policy. The latter can, as suggested, be taken care of by the cabinet office.

a need for greater coordination in the national research and innovation system than the RIC appears to exert today. We can envisage four possibilities.

- A coordinated effort by the Academy and Tekes, though this has not proved sustainable in the past
- Setting up new temporary organisations for the coordination of specific areas of strategic research. This has worked in the Netherlands but the transaction costs involved are high
- Through programming and setting up a permanent organisation with the assignment for strategic programmes. Creating such an organisation in a free-standing form would require reproducing many of the competences of the Academy and Tekes in an additional funding organisation
- Through the recently suggested strategic funding instrument within the Academy but with procedures separate from the more 'traditional' Academy funding processes. This would have two agendas: to manage the strategic funding ring-fenced for the institute sectors; and to fund high-quality strategic research in the universities and institutes more broadly. It would have governance that ties it to societal stakeholders outside as well as inside the research community. Here, the main risk would be failure to make the necessary governance and information links to industry, the ministries and other non-research community stakeholders

Given the plans for the imminent reform of the government research institutes and the creation of a strategic research instrument, it would be most opportune to extend this structure to cater to the needs for strategic research funding. The opportunity would, however, be lost if the targeting of research activities were to take place too close to day to day political decision-making, as some of the current plans imply. This could repeat the mistake that the SHOK funding made: linking research needs to too short-term goals and, thus, largely failing to attract academia to the programme or to catalyse novel research with middle to longer-term goals.

## 6.3 Recommendations

Our overall recommendations are similar to those of the panel. This is not surprising – they are largely based on the same evidence. The reader may nonetheless find it useful to read both (see Appendix A).

1. A decision about what the Academy does and does not do is part of a bigger decision about the design of the fund-

ing system. From the perspective of this evaluation, **the Academy's role should be extended into strategic research funding outside the traditional responsive mode.**

2. The Academy's role as advice giver is generally criticised and we share the view that the Academy under-utilises its opportunities to generate strategic intelligence and to deploy this in policy advice. It has already recognised that it can provide more information to the research-performing organisations, so as to support their developing strategies and help them improve their performance. It would help if MEC or the RIC could more clearly specify about what kind of advice they want. In our view, **the Academy should play a more active role in science policy, focusing on policy for science** (as opposed to 'science for policy', ie providing scientific evidence as input to policy formulation in other fields). That would enable it to make best use of its knowledge and networks without at the same time encroaching on the national level of policy coordination that belongs at the level of the RIC.
3. A stronger advice-giving role would require clearer separation of function between the Academy Board and the Research Councils. It is possible to go further. If, as appears to be the case, Finland lacks a strong advocate for science and provider of science-based and science policy advice, in the style of the Royal Society in the UK or KNAW in the Netherlands, then there would be merit in developing a wider advisory function (covering both science for policy and policy for science as well as other activities that support the legitimacy of research in society) and putting it into a separate institution. The US model, where the academy function is close to but separate from the funding function, could also be a source of inspiration. **The MEC should strengthen its efforts to foster an independent 'science academy' function outside the Academy of Finland.**
4. There are other reasons to encourage a looser coupling between the Board and Research Council levels, in particular that since half the Board comprises the heads of the Research Councils, the result appears to be a stalemate when it comes to allocating resources. The Board cannot make strategy when it is effectively the joint captive of the various scientific communities. This is evident both from the allocation of resources among the Councils, the uniformity of their success rates and the fact that the Academy's strategy effectively repeats its mission statement rather



than being explicit about how the mission will be achieved.

**The Board should be strengthened by adding others knowledgeable about research and innovation. The Research Council heads should become observers with speaking but not voting rights.**

5. More broadly, the Academy needs to become more proactive and goal-orientated in its behaviour. Its current culture focuses on doing processes rather than having impacts.  
**The Academy should formulate a new strategy that is specific about what goals and verifiable objectives it intends to reach, as well as the means it intends to use in reaching them. This should not involve setting arbitrary numerical targets but should include specific statements about the Academy's intended impacts in research and society.**
6. If the Academy is to have a strategy, it will need clearer principles for programming. These are currently opaque, at least to us, and may in any case need to be revised if the Academy seriously wishes to pursue some of the major challenges, as its Board has already decided. **The Academy should make a clear statement about why it programmes and establish clear procedures and criteria for doing so.**
7. At the level of traditional processes, there is a lot to commend and little to criticise. Like all research councils, the Academy is constantly challenged to provide adequate treatment of interdisciplinary proposals. The available evidence is that these are not discriminated against. **The Academy should be more explicit about what it believes 'high risk'/groundbreaking research is, why it should fund it and what specific processes and/or allocations it will use for that purpose.** A specific funding stream for groundbreaking research would be a better guarantee that such research is desired.
8. There is universal dissatisfaction with the Full Economic Cost (FEC) system, which appears to be poorly understood (and we suspect often deliberately misunderstood for rhetorical purposes) and which has effectively reduced the amount of research the Academy can fund. There is nonetheless every reason to want to understand full economic costs – as every economist knows, wrong information leads to wrong decisions. While the change to a FEC system was intended to be neutral with respect to the amount of research the Academy could fund, it appears to have reduced that volume. **The FEC system should be revisited and clarified so that it becomes easier to**

**operate, e.g. to implement standardised percentages (for each domain). MEC should consider transferring budget from university core funding to the Academy in order to restore the volume of research funded to its previous level.**

9. The Academy's international strategy is a work in progress. It is in any case dependent on what internationalisation policies Finland as a whole adopts. Finland's peripheral geography, the movement towards an ERA and the wider pattern of globalisation and change in the relative importance of different parts of the world all argue for explicit strategy at the national level, of which the Academy's strategy should be a component. The 'mainstreaming' of internationalisation within the Academy is positive and useful and should not be abandoned. The cost of mainstreaming, however, is loss of focus. Hence, **the Academy should develop a new internationalisation strategy that sets geographic and thematic priorities and criteria for changing them over time. Such a strategy should be developed hand in hand with MEC, TEM, Tekes and eventually the other sector ministries and institutes in order to tackle especially the European dimension where national science policymakers at both agency and ministry level need to negotiate with the European level and other Member States in a coherent way. It should explicitly consider the Nordic level.**
10. Given the growing complexity of the international environment, the ability of the MEC to coordinate and make policy is vital. The burden of coordination is increasingly high, especially in relation to Europe. **MEC and the Academy should jointly explore whether they have sufficient capacity in place to play the needed coordination role in relation to international (especially European) research and innovation policy.**

## APPENDIX A

# Evaluation of the Academy of Finland: Report of the Peer Review Panel

Susan Cozzens, Jos van der Meer, Jens Nielsen and  
John O'Reilly  
May 2013

### Introduction

This document reports a panel review of the Academy of Finland, conducted on 8-9 April 2013. It forms an integral part of the wider evaluation of the Academy undertaken by Technopolis and ETLA in 2012-3. It is in a double sense a peer review. First, the panel members are all senior scientists, one from each domain represented by the Academy's four research councils, so we bring the perspective of research practitioners to the evaluation. Second, we all have significant experience of research funding organisations and their operation, so we also provide the perspective of funding practitioners.

The panel was asked to tackle the same set of evaluation questions as the overall evaluation, so that it is possible to 'triangulate' between the panel's views and the conclusions derived from the desk studies, surveys, interviews and benchmarks conducted by the Technopolis/ETLA team. Those questions were to evaluate

1. The success of the Academy of Finland in implementing the tasks specified in the Act on the Academy of Finland and the targets set in the performance agreement between the Ministry of Education and Culture and the Academy.
2. The role of the Academy of Finland in the research and innovation system – do the Academy's structure, the Ministry (performance) guidance and the operating practices serve the overall development of the Finnish research and innovation system? Relationship with key stakeholders?
3. The role of the Academy of Finland in supporting the strategic development of key research actors in particular universities and research institutes.
4. The role of the Academy of Finland in promoting the internationalisation of the scientific community and the body of scientists
5. Division of labour, operation and organisation of the Board, the Research Councils and the Administrative Office.

We do not in this peer review tackle the detail of the targets set in the performance agreement (Question 1). That issue is handled in the overall evaluation.

## Background

### Basis of the peer review evaluation

The panel had the following evidence available in order to perform its task.

- A self-evaluation by the Academy, which similarly addressed the five evaluation questions
- A draft of key parts of the Technopolis/ETLA report
- The Act concerning the Academy and the Performance Agreement between the Ministry of Education and Culture and the Academy for 2011-2
- Other key background reports
  - A bibliometric study of Academy-funded versus other research in Finland conducted on behalf of the Academy by Aalto University, 2013
  - The Academy Report 'State of Scientific Research in Finland 2012'
  - The evaluation of Tekes, 2012
  - A report of the Swedish Academy of Sciences on Fostering Breakthrough Research, which compares Sweden, Finland and a number of other countries, 2012
- Two days of discussion and interviews with the Academy and relevant stakeholders. Those interviewed and the timetable are shown at the end of this document

### The Academy of Finland

We are grateful to colleagues at the Academy for a warm welcome, for hosting the panel and arranging meetings with stakeholders. We were struck by the quality of the team, their ambitions further to improve the Academy's performance and the respect in which the Academy is held generally in the research community. The President and Vice-President for Research are rather new in post and bring a particular enthusiasm to the leadership of the Academy. Board and Research Council members are appointed and retire in rotation, so these organs contain a healthy mixture of 'new blood' and experience. It is important that this leadership potential should result in substantive changes – in particular, to an extension of the Academy's culture from stressing good process to also taking greater responsibility for outcomes.

On a minor point, some panel members were initially confused by the name of the Academy, since its major function is actually to fund research rather than to function as a traditional science<sup>(89)</sup> academy. While it would be foolish to abandon the strong identity and 'brand' that the Academy of Finland has built up at home, it may be useful to think about adding an explanatory 'strap line'<sup>(90)</sup> to the title in the Academy's English language communications.

## Findings

### The success of the Academy in implementing its tasks

The formal objectives of the Academy as laid down in the Act are

1. To foster scientific research and its utilisation
2. To promote international scientific cooperation. (We discuss this aspect in a separate section, below.)
3. To serve as an expert organ in science policy questions
4. To grant funding for scientific research, researcher training and developing research capabilities
5. To execute other science policy expert tasks laid down in the Government decree or assigned to it by the Ministry of Education

In the view of the panel, the Academy functions strongly in its granting role, which it sees as its core competence and its principal means of fostering scientific research, but there is scope for development and improvement in its other functions.

On the evidence we have seen, the Academy's processes for assessing and funding research proposals are consistent with good international practice in peer review. Within each of its four Research Councils, it uses a two-step system of e-mail review followed by prioritisation in panels that can respond to changes in demand among research themes. Panel priorities are reviewed by the Research Councils, which then decide which proposals to fund. One weakness of the system is that applicants do

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89 Throughout this document we use the word 'science' in the broad sense, encompassing all disciplines, including the social sciences, arts and humanities

90 For example 'The Academy of Finland – the Finnish Research Funding Councils'

not have the opportunity to comment on and correct misunderstandings or factual inaccuracies in peer reviews, prior to these being considered by the panels.

All such processes face difficulties in addressing inter-disciplinary proposals and while the research community expresses anxiety that this may also be the case at the Academy, panels can be used flexibly to tackle the problem at the initiative of Academy staff and panel chairs. Available evidence suggests the success rates for mono- and inter-disciplinary proposals are in fact similar. A study commissioned as a result of the previous evaluation showed that 21% of interdisciplinary proposals and 19% of monodisciplinary proposals were successful in the General Programme of bottom-up research funding<sup>91</sup>. Processes for handling interdisciplinarity do not appear to be strongly formalised and while proposal assessors are encouraged to fund risky research there is no definition of risk or a specific process for addressing it. The type of mechanism used, for example, by the US National Science Foundation where programme officers can within limits initiate programmes to fill gaps or tackle new directions appears to be absent.

The Academy has a wide range of funding instruments. Historically, it has devoted a lot of its resources to personal fellowships, in order to compensate for inflexibilities in the organisation of the Finnish universities with their strong teaching orientation. The increased autonomy of the universities and their growing use of different tenure track systems has enabled the Academy to hand over to the universities the function of acting as fellows' employers and to devote resources increasingly to funding projects rather than people. It is nonetheless important that the Academy support people throughout their careers. In the past there may have been over-emphasis on the later career stages. The post-doc and early career stages also require attention.

The Academy's instruments include centres of research excellence that can support the development of critical mass in research and combat the fragmenting effect that teaching otherwise tends to have on research strategy. It also operates small-scale research programmes, intended either to encourage the development of emerging fields or more recently also to address various 'grand challenges' identified by the Academy Board.

While the Academy has a small 'science communications' function, it does little else to tackle its responsibility to foster the utilisation of research – except, of course, in so far as research results tend themselves to feed forward into more research. As in other countries, schemes such as 'competence centres' and programmes that foster the commercialisation of research results lie outside the sphere of competence of research councils. Nor has the Academy specifically funded 'strategic' or 'translational' research in the past (although some of its bottom-up portfolio is likely to have such a character).

The Academy is charged with acting as 'an expert organ in science policy questions'. Given the existence of the Research and Innovation Council (RIC) at the government level, it would be reasonable for the Academy to address a narrower set of issues specifically related to science and research, using its access to the scientific community to generate more fine-grained advice than the RIC could otherwise obtain. Its regular analyses of the state of Finnish research are useful and well respected, even if there is scope for much more detailed analysis to be undertaken in support of a more activist science policy. While we recognise that MEC has limited manpower to tackle science policy questions, it could usefully be more demanding and specific about the advice it wants from the Academy, which could in turn be considerably more proactive in this area.

In performing its expert advice function, one of the things the Academy could consider is to reach beyond its existing Research Councils to other experts for forward-looking advice. For example, it could use the alumni of the Millennium Prize.

The way the Academy addresses its tasks is largely reactive. As a result, Academy funding reflects more

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91 Henrik Bruun, Janne Hukkinen, Katri Huuoniemi and Julie Thomson Klein, *Promoting Interdisciplinary Research: The Case of the Academy of Finland*, Publications Series 8/05, Helsinki Academy of Finland, 2005

than shapes the characteristics of the research system it supports. Thus, for example, while the Academy's own analysis points to stagnation in the overall quality of Finnish academic research (unlike the other Nordic countries, where quality continues to improve) it appears to have taken no specific steps to address the problem over and above conducting 'business as usual'.

### Role in the research and innovation system

Finland has two major funders of research. The Academy focuses on investigator-initiated work while Tekes, an agency of the Ministry of Employment and the Economy (TEM), has traditionally funded industry-relevant applied research in the universities, institutes and industry itself via a wide range of technology programmes, defined in discussion between industrial and academic stakeholders. A number of other ministries fund research in support of their own missions, largely via captive government laboratories.

While some members of the research community would like to see the Academy as their representative organisation in relation to the government, it is in fact an executive agency of the Ministry of Education and Culture (MEC). It is also subject to coordination from the RIC, via MEC, and its president is a member of the RIC. As an agency, it is important that the Academy obtain clear policy direction from the Ministry. It must also be – and be seen to be – independent of MEC in the implementation of policy and in decisions about which individual people or projects to fund or not to fund.

Since science is part of society, the actions of the Academy cannot be treated in isolation from the rest of the national research and innovation system. During the time of the Additional Appropriation for R&D (at the end of the 1990s and start of the last decade), the Academy and Tekes were able to take a coordinated approach to funding in a number of areas of industrial importance to Finland. Since then, however, while we were told that relations between the two organisations are such that there is good cooperation and interaction at the level of individual officers, there is little evidence of

coordination at agency level. The two organisations have been involved in common foresight and impact analysis methodology projects and operate their respective parts of the Finland Distinguished Professors (FiDiPro) programme. However, there is no sign of common ways of tackling things like the grand challenges or any attempt to co-programme.

During the last decade, Tekes' focus has shifted to some degree away from technology programmes and towards the promotion of entrepreneurship in individual firms. Quite a number of our interviewees argued that this has opened up a gap in funding for industrially relevant but longer term applied research. Equally, while Europe is beginning to align funding to meeting the so-called 'grand challenges', equivalent cross cutting strategies and activities are not appearing in Finland, nor is there a high-level national strategy that sets out broad research and innovation priorities. A coordination deficit appears therefore to be arising in the system as a whole. The Academy is not getting clear signals about how its role should be changing as the needs of the research and innovation system as a whole change. Equally, it is failing to evolve to contribute to addressing these changing needs, even as the system around it changes.

The Academy has been criticised for providing only limited support to the new SHOK centres, which are intended to promote mid- to long-term strategic research in order to strengthen the research and technology areas of importance to Finland and to create new knowledge base for society and the economy. They build on collaboration between industries and the universities and research institutes. The recent evaluation of the SHOKs as well as evidence collected in the evaluation of the Academy indicate that the current structure and governance of the SHOKs in practice make them unattractive to university researchers because they tend to address shorter-term industrial needs rather than a mix of middle term and more fundamental questions they were intended to tackle. If the SHOKs are reconfigured so that their governance involves a mix of academic and industrial interests, it will become easier for the Academy to fund them.

There is a proposal to channel some of the core funding from government laboratories through a new department within the Academy in order to fund strategic research relevant to their missions. Without comment on that proposal in detail, we note that such an additional function would require a quite different culture and set of processes, compared with those of the Academy today. It would also represent a rather special sub-set of strategic research and would not address the emerging funding gap we discuss above. It may be worth considering a more comprehensive approach to strategic research than that currently proposed, in order to tackle this emerging need in a more holistic manner.

The Academy does not play the role of a traditional Academy of Science (such as the Royal Society in the UK or the National Academy of Sciences in the USA) in providing scientific advice and advocacy for research and its public understanding in the overall Finnish system. We have not examined the functioning of the learned societies that in principle could take on this role, but understand that their activities may be sub-critical. It would be possible for the Academy to take on such a role, provided a greater separation of function could be achieved between the Academy role and the funding role but international experience suggests that a funding role tends to undermine the credibility of an advice-giving role. We suggest that if there is a desire to strengthen the advisory and advocacy roles in Finland that should probably be done outside the Academy of Finland.

### Supporting the strategic development of key actors

So far, the way the Academy supports universities' and research institutes' development is through providing funding opportunities. As with the Centres of Excellence, these can provide incentives that encourage particular behaviours. While it is clearly not the Academy's business to set the strategies of autonomous research-performing institutions, there is scope for more active encouragement of change – for example in adjusting the relative investment among certain fields.

The Academy has a lot of valuable information about research groups' success in obtaining funding and on wider patterns in funding, which it could better exploit by communicating it in a suitably anonymised form to the research-performing institutions and to other policy organisations, helping them to develop their autonomous strategies. The Academy should explore the extent to which it can add value to the data it collects and use these to a greater extent in the development of both national and institutional policy.

The Academy has moved to funding 70% of the 'full economic cost' (FEC) of research in the institutions it supports, requiring the research-performing institutions to pay for the rest from their other institutional funding. In the Finnish implementation of FEC, the salary costs of tenured academics can in principle be funded by the grant for up to a year but are in practice not normally included, so the system appears to be a hybrid of marginal and full costs. The principle of basing funding on FEC is a good one because by making costs transparent it should enable better decision-making and eliminate unwitting cross-subsidy between teaching/other activities and research. A problem is that the block grants to the universities apparently do not distinguish between education and research, making the institutional economics and contribution difficult to understand. FEC seems to be widely misunderstood and is seen as increasing bureaucracy and the amount of administration that has to be done, as opposed to increasing transparency. There is a clear need to improve the implementation of FEC and the associated administration.

### Internationalisation

Geography and language conspire to make Finland peripheral and the need to combat this tendency has long been recognised in Finnish research and innovation policy. There is no clear overall internationalisation strategy and some of the 'rules of the game' make it hard to spend time abroad and attract people from abroad. Thus, while the top research groups are internationally mobile and well connected, the overall level of international mobility



is not very high – reflected in the modest proportion of non-nationals among research staff and the modest proportion of people who do part of their doctoral training or post-doctoral work abroad.

The European dimension of internationalisation presents particular challenges, in so far as it involves coordinating governance and funding instruments at national and European level. The sheer volume of interaction needed with Brussels is hard for most small countries to maintain. Most tackle this through close cooperation between relevant ministries and agencies. Failure to make strategy at the national level easily fragments the national effort, so we note with some concern the fact that Finland seems to be participating in all the Joint Programming Initiatives without apparently having made a strategic decision to do so. There appears to be scope for the Academy to work more closely with MEC in handling EU research funding issues.

### Organisation of the Academy

The overall structure of the Academy, comprising a number of research councils under an overall ‘umbrella’, is common internationally, with varying degrees of individual autonomy. While the individual Research Councils are reasonably well placed to handle interdisciplinary matters within their own thematic areas, the Academy lacks mechanisms to tackle these across the four Councils. We note that there has been great stability in the proportions of the Academy budget allocated to each of the Councils and the Academy itself informed us that the disciplinary structure of the Finnish research community itself is rather stable. While at the level of individual panels within the Research Councils there appears to be a degree of change, the overall funding stability confirms the reactive nature of the Academy’s approach and is in itself unhealthy, risking failure to adapt to changes in the needs or shape of scientific endeavour.

This stasis is encouraged by the composition of the Academy Board, in which the heads of the Research Councils together constitute a majority. The resulting stalemate means that there is little interest in changing the status quo. The overwhelmingly

academic composition of the Board has the further effect of reducing connectivity between the Academy and other stakeholders in research, innovation and society more broadly.

### Recommendations

While the Academy of Finland has done well in its traditional funding role, institutions do not exist in isolation from the societies, cultures and policy contexts in which they operate. Our overall conclusion is that the Finnish research and innovation system has been changing but that the Academy has not changed sufficiently to keep up with the needs of that system. This problem is exacerbated by the fact that there is something of a strategic vacuum at the national level in research and innovation policy. So a traditionally reactive organisation like the Academy suffers from a lack of something to which to react. Part of the solution is to change the Academy into a more proactive organisation, better connected into wider social needs and focusing to a greater extent on generating outcomes rather than only operating good processes. That is easier said than done, but the quality of the staff and leadership provide good grounds for optimism. We therefore recommend as follows.

1. Finland appears to lack a strategic research funding function to address needs-driven basic and longer-term applied research. Both the emerging gap between the Academy and Tekes and the need to strengthen the strategic research of the government labs point in this direction. It would require different processes and a different culture compared with that of the Academy today, so it is not immediately obvious whether the function should sit inside or outside it. There are various international models: outside (Strategic Research Council, Denmark); inside (EPSRC, UK); integrated with basic research and innovation (RCN, Norway). In any case, **the Finnish authorities should consider establishing a dedicated strategic research funding function.**
2. While Finland has learned societies that could advocate and explain science as well as to provide science-based advice (science for policy), these functions do not appear to be very effectively performed. **MEC should further**

**increase its efforts to foster a strong traditional science academy outside the Academy of Finland.**

3. The Academy of Finland currently plays only a modest role in providing science policy advice to government in general and MEC in particular. Both the wording of the Act establishing the Academy and the needs of society and government at large suggest that **the Academy should be significantly more proactive and effective in delivering advice on policy for science.** This requires increased analytical resources within the Academy and greater use of the Academy's scientific links both inside and outside the community it funds. MEC could usefully be more specific in explaining the type of input it would find helpful.
4. While the Academy's assessment processes generally adhere to good international practice, it should **consider introducing the opportunity for applicants to comment on and correct misunderstandings or factual inaccuracies in peer reviews, prior to these being considered by the panels.**
5. A useful step in enabling the Academy to act as a change agent, encouraging new developments in science and connecting research and the creation of research capacity to the 'grand challenges' its Board has decided to pursue would be a more structured and explicit process of programming a minority of the Academy's resources. **Programming in the Academy should become more transparent and more clearly be linked to needs both inside and outside science. Programmes should explicitly be linked to the Academy's overall strategy.**
6. The focus of the Academy's fellowship and project funding has been changing over time. At the same time, the introduction of tenure track systems in the universities induces a need for change. **The Academy should ensure that its funding instruments collectively cover all stages of the research career.**
7. So far, the Academy has only to a limited extent used the rich stock of data in its possession to help inform research performers how to improve their strategies or explored opportunities to improve the division of labour within the national research community. **The Academy should further exploit the data in its position to support strategy development by research performers as well as national science policy.**

8. The Full Economic Cost principle is a good one, which should increase the transparency and rationality of the research performing institutions over time. However, its implementation in Finland and the Academy appears to be partial and poorly understood, with associated problems.

**The Academy, MEC and the research performing institutions should review the FEC principle with a view to improving its implementation.**

9. The Academy has closed its international department and 'mainstreamed' internationalisation. At present, however, it appears not to have a strategy in a sphere that is complex, large and requires choices to be made. **The Academy should develop an explicit internationalisation strategy in cooperation with MEC that tackles both the EU and the global levels.**
10. The composition of the Board leads to stasis in the division of Academy funding and fails to establish the needed connectivity between the Academy, the research community and other important stakeholders. **The Academy's Board membership should be adjusted and modestly increased to include people from additional stakeholder communities, with Research Council Chairs becoming observers rather than formal members of the Board to avoid possible perceptions of conflict of interest.**

Professor Susan Cozzens

Professor Emeritus Jos WM van der Meer

Professor Jens Nielsen

Sir John O'Reilly

## Division of labour, operation and organisation

Figure 57 Timetable and Interviewees of the Peer Review Panel

|             |   |
|-------------|---|
|             | <b>Monday 8 April</b>   |
| 09.00-12.00 | Internal work   |
| 12.00-14.00 | Heikki Mannila, Marja Makarow, Ossi Malmberg, Anne Heinänen                                 |
| 14.00-15.00 | <b>2 university vice-rectors for research and top manager from major research institute</b> |
|             | Johanna Björkroth   |
|             | Ilkka Niemelä   |
|             | Yrjö Viisanen   |
| 15.15-16.15 | <b>MEC</b>  |
|             | Anita Lehtikoinen   |
|             | Riitta Majjala  |
|             | Ilkka Turunen   |
|             | Erja Heikkinen  |
| 16.30-17.30 | <b>4 senior researchers with experience of the Academy</b>                                  |
|             | Johanna Mappes  |
|             | Martti Kauranen   |
|             | Anne Kovalainen   |
|             | Seppo Ylä-Herttua   |
|             | <b>Tuesday 9 April</b>  |
| 09.00-10.00 | Internal work   |
| 10.10-11.10 | <b>Board members from the Academy</b>   |
|             | Kai Lindström   |
|             | Arto Mustajoki  |
|             | Päivi Törmä   |
|             | Tuula Tamminen  |
| 11.20-12.20 | <b>R&amp;D representatives from a major company and Tekes</b>                               |
|             | Riikka Heikinheimo  |
|             | Jukka Rantala   |
| 12.30-13.30 | <b>The RIC secretariat</b>  |
|             | Anssi Mälkki  |
|             | Kai Husso   |
| 13.30-16.00 | Internal work   |
| 16.00-16.30 | Initial feedback to Heikki Mannila  |

The panel meeting was additionally attended by Erik Arnold and Frank Zuidam (Technopolis) and Terttu Luukkonen (ETLA)

## APPENDIX B

# The Academy's portfolio

### B.1 Personal grants

| Personal grants  | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|------|------|------|------|------|------|------|------|
| Academy professor  | x    | x    | x    | x    | x    | x    | x    | x    |
| Academy research fellow  | x    | x    | x    | x    | x    | x    | x    | x    |
| Senior scientist's research grant  | x    | x    | x    | x    | x    | x    | x    |      |
| Postdoctoral researchers, applications from individual researchers   | x    | x    |      |      |      |      |      |      |
| Postdoctoral researchers, applications from research teams   | x    | x    |      |      |      |      |      |      |
| Postdoctoral researchers, applications from a public administration organisation, a business company or other business or industry organisation together with a university | x    | x    |      |      |      |      |      |      |
| Postdoctoral researcher  |      |      | x    | x    | x    | x    | x    | x    |
| Finland distinguished professor programme (Fi-DiPro)   |      |      | x    |      | x    |      | x    |      |
| Researcher mobility in working life  |      |      | x    | x    | x    | x    | x    |      |
| Doctoral studies of employed persons   | x    | x    | x    | x    | x    | x    | x    |      |
| Researcher training and research abroad  | x    | x    | x    | x    | x    | x    | x    |      |
| Researcher mobility from Finland   | x    | x    | x    | x    | x    | x    | x    | x    |
| Researcher mobility to Finland   | x    | x    | x    | x    | x    | x    | x    | x    |
| Start-up money for young researchers   | x    | x    |      |      |      |      |      |      |
| European Young Investigators Award EURYI   | x    | x    | x    |      |      |      |      |      |
| Subsidy for a researcher's return to Finland   | x    | x    |      |      |      |      |      |      |
| Work of foreign researchers in Finland   | x    |      |      |      |      |      |      |      |

| <b>Personal grants</b>  | <b>2004</b> | <b>2005</b> | <b>2006</b> | <b>2007</b> | <b>2008</b> | <b>2009</b> | <b>2010</b> | <b>2011</b> |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Grants for researcher training and research in the USA in fields supporting business know-how | x           | x           | x           | x           |             |             |             |             |
| Researcher training at European University Institut (EUI)                                     | x           | x           | x           |             |             |             |             |             |
| Postdoctoral researcher funding at European University Institut (EUI)                         |             |             |             | x           | x           | x           | x           | x           |
| Health research exchange programme between Finland and the Netherlands                        | x           | x           |             |             |             |             |             |             |
| Ageing research: FLARE 2 Postdoctoral Researchers   |             |             |             |             |             |             |             | x           |
| Travel funding to IIASA   |             |             | x           | x           | x           | x           | x           | x           |
| Academy of Finland support to researchers successful in ERC Calls                             |             |             |             |             |             | x           | x           | x           |
| Targeted funding:   |             |             |             |             |             |             |             |             |
| - Promoting clinical research careers   |             |             | x           | x           | x           | x           | x           | x           |

Academy of Finland; x = call launched; x (red) = ongoing/in portfolio 2012

## B.2 Non thematic projects and programmes

| <b>Non thematic projects and programmes</b>                          | <b>2004</b> | <b>2005</b> | <b>2006</b> | <b>2007</b> | <b>2008</b> | <b>2009</b> | <b>2010</b> | <b>2011</b> |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Academy projects*  | x           | x           | x           | x           | x           | x           | x           | x           |
| Centres of Excellence in Research                                    | x           | x           | x           | x           | x           | x           | x           | x           |
| Preparation of international cooperation (joint) projects            | x           | x           | x           | x           | x           | x           |             |             |
| Support to graduate schools and national researcher training courses | x           | x           | x           | x           | x           | x           | x           | x           |
| Subsidy to scientific societies**                                    | x           | x           | x           |             |             |             |             |             |
| Subsidy for organising international scientific conferences***       | x           | x           | x           | x           | x           |             |             |             |
| National scientific seminars***                                      | x           | x           | x           | x           | x           |             |             |             |

Academy of Finland; x = call launched; x (red) = ongoing/in portfolio 2012; \* former General round of applications for research appropriations; \*\* funding transferred to the Federation of Finnish Scientific societies in 2005; \*\*\*funding transferred to the Federation of Finnish Scientific societies in 2008.

## B.3 Thematic programmes

| Thematic programmes   | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|------|------|------|------|------|------|------|------|
| Grants for development studies  | x    | x    | x    | x    | x    | x    | x    | x    |
| Antarctic research (call every fourth year)   | x    |      |      |      | x    |      |      |      |
| Grants for researcher training and research in the USA in fields supporting business know-how             | x    | x    | x    | x    |      |      |      |      |
| US-based researchers' visits to or research in Finland in fields supporting business know-how             |      |      |      | x    |      |      |      |      |
| Health research exchange programme between Finland and the Netherlands                                    | x    | x    |      |      |      |      |      |      |
| Researcher training at European University Institut (EUI)   | x    | x    | x    |      |      |      |      |      |
| Postdoctoral researcher funding at European University Institut (EUI)                                     |      |      |      | x    | x    | x    | x    | x    |
| Ageing research: FLARE 2 Postdoctoral Researchers   |      |      |      |      |      |      |      | x    |
| <b>Nordic Centres of Excellence Programmes</b>  |      |      |      |      |      |      |      |      |
| Global Change (NOS-N) (2002-2007)   |      |      |      |      |      |      |      |      |
| Molecular Medicine (NOS-M) (2004-2009)  |      |      |      |      |      |      |      |      |
| HumSam (NOS-HS) (2005-2010)   |      |      |      |      |      |      |      |      |
| Welfare (2006-2010)   |      |      |      |      |      |      |      |      |
| Food, Nutrition and Health (2007-2011)  |      |      |      |      |      |      |      |      |
| The Top-level Research Initiative (TRI) on climate, energy and environment (2009 - 2013)                  |      |      |      |      |      |      |      |      |
| <b>Research programmes:</b>   |      |      |      |      |      |      |      |      |
| - Environment and Law (2005 - 2008)   | x    |      |      |      |      |      |      |      |
| - The application of information technology in mechanical, civil and automation engineering (2005 - 2009) | x    |      |      |      |      |      |      |      |
| - Business-Know-how (2006 - 2009)   |      | x    |      |      |      |      |      |      |
| - Neuroscience (2005 - 2009)  |      | x    |      |      |      |      |      |      |
| - Sustainable Production and Products (2006 - 2013) (international coop.*)                                |      |      | x    |      |      |      |      |      |
| - NanoScience FinNano (2006 - 2010)   |      |      | x    |      |      |      |      |      |
| - Substance Use and Addictions (2007 - 2010)  |      |      | x    |      |      |      |      |      |
| - Nutrition, Foods and Health (2007 - 2011) (international coop.*)  |      |      | x    |      |      |      |      |      |
| - Power in Finland (2007 - 2010)  |      |      | x    |      |      |      |      |      |
| - The future of work and well-being (2008 - 2011)   |      |      |      | x    |      |      |      |      |
| - Sustainable energy (2008 - 2012) (international coop.*)   |      |      |      | x    |      |      |      |      |
| - Responding to Public Health Challenges (2009 - 2012)  |      |      |      |      | x    |      |      |      |
| - Ubiquitous Computing and Diversity of Communication (2009 - 2012)                                       |      |      |      |      | x    |      |      |      |
| - The Health and Welfare of Children and Young People (2010 - 2014)                                       |      |      |      |      |      | x    |      |      |
| - Photonics and Modern Imaging Techniques (2010 - 2013)   |      |      |      |      |      | x    |      |      |
| - Computational Science (2010 - 2015)   |      |      |      |      |      | x    |      | x    |
| - Climate Change (2011 - 2014)  |      |      |      |      |      |      | x    |      |
| - Future of Housing and Living (2011 - 2015)  |      |      |      |      |      |      |      | x    |



\* the res.progr. ended but projects funded via internat. call(s) continuing

| Targeted funding:  |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|
| - Stem cell research   | x |   |   |   |   |   |   |   |
| - Taxonomy and systematics research  | x |   |   |   |   |   |   |   |
| - Internationalisation of ageing research                                    | x |   |   |   |   |   |   |   |
| - Interaction between art and research                                       | x |   |   |   |   |   |   |   |
| - Basic research in programming, algorithms and their support functions      | x |   |   |   |   |   |   |   |
| - Additional funding for future electronics research programme               | x |   |   |   |   |   |   |   |
| - with NSF for research projects in material science and engineering         | x | x | x | x | x | x | x | x |
| - Plant and animal ecophysiology   |   | x |   |   |   |   |   |   |
| - Modeling and Simulation Technology   |   | x |   |   |   |   |   |   |
| - The media in Russia  |   | x |   |   |   |   |   |   |
| - Nursing research   |   | x |   |   |   |   |   |   |
| - Integrative physiology   |   | x |   |   |   |   |   |   |
| - Promoting clinical research careers  |   |   | x | x | x | x | x | x |
| - Effectiveness of diagnostics and treatment                                 |   |   | x |   |   |   |   |   |
| - Remote sensing and geoinformatics  |   |   | x |   |   |   |   |   |
| - Rural studies  |   |   | x |   |   |   |   |   |
| - Forest industry's smart products and processes                             |   |   |   | x |   |   |   |   |
| - Basic security   |   |   |   |   | x |   |   |   |
| - Embedded systems (processor architecture and software development methods) |   |   |   |   | x |   |   |   |
| - Dental research  |   |   |   |   | x |   |   |   |
| - Ecological and evolutionary genomics                                       |   |   |   |   |   | x |   |   |
| - Migration  |   |   |   |   |   | x |   |   |
| - Research that utilises the infrastructures of space and astronomy research |   |   |   |   |   | x |   |   |
| - Mechanical engineering   |   |   |   |   |   | x |   |   |
| - Water engineering  |   |   |   |   |   | x |   |   |
| - Energy efficiency  |   |   |   |   |   |   | x |   |
| - Rehabilitation research  |   |   |   |   |   |   | x |   |
| - Functional mechanisms of new post-genomic proteins and protein complexes   |   |   |   |   |   |   | x |   |
| - Strategic Centres for Science, Technology and Innovation                   |   |   |   |   |   |   |   | x |
| Research projects jointly funded with foreign funding organisation:          |   |   |   |   |   |   |   |   |
| - Vaccine research, diagnostics and drug development (DBT, India)            |   |   | x |   |   |   |   |   |
| - Business know-how (RFH, Russia)  |   |   | x |   |   |   |   |   |
| - Optic materials (RFBR, Russia)   |   |   | x |   |   |   |   |   |
| - Cross-cultural communication (CASS, China)                                 |   |   |   | x |   |   |   |   |
| - Life Sciences and Medical Sciences (JSPS, Japan)                           |   |   |   | x |   |   |   |   |
| - Material engineering and biosciences (RFBR, Russia)                        |   |   |   | x |   |   |   |   |

|  |  |  |  |   |   |   |   |   |
|--|--|--|--|---|---|---|---|---|
| - Plant and crop biotechnology (DBT, India)  |  |  |  | x |   |   |   |   |
| - Environmental research (ASRT, Egypt)   |  |  |  | x |   |   |   |   |
| - Ecology, environmental and energy research (NSFC, China)   |  |  |  | x |   |   |   |   |
| - Sustainable energy (2008 - 2011), joint call with CONICYT, Chile   |  |  |  | x |   |   |   |   |
| - Environmental biotechnology (DBT, India)   |  |  |  |   | x |   |   |   |
| - Ubiquitous Computing and Diversity of Communication (2009 - 2012), joint call with NSFC, China             |  |  |  |   | x |   |   |   |
| - Ubiquitous Computing and Diversity of Communication (2009 - 2012), joint call with RFH, Russia             |  |  |  |   | x |   |   |   |
| - Linguistics (RFH, Russia)  |  |  |  |   | x |   |   |   |
| - Sustainable Production and Products (2006 - 2013), joint call with ANR, France                             |  |  |  |   | x |   |   |   |
| - Ubiquitous Computing (JSPS, Japan)   |  |  |  |   | x |   |   |   |
| - Materials research (JST, Japan; Tekes)   |  |  |  |   |   | x |   |   |
| - Sustainable energy (2008 - 2012), joint call with CNPq, Brazil   |  |  |  |   |   | x |   |   |
| - Biomass-related research (ANR, France)   |  |  |  |   |   | x |   |   |
| - History (RFH, Russia)  |  |  |  |   |   | x |   |   |
| - Medical diagnostics (DBT, India; Tekes)  |  |  |  |   |   | x |   |   |
| - Signal processing and computational sciences (NSFC, China)   |  |  |  |   |   | x |   |   |
| - ELSA Genomics (BMBF, Germany; BMWF, Austria)   |  |  |  |   |   | x |   |   |
| - Sustainable energy (2008 - 2012), joint call with N-INNER (Nordic)   |  |  |  |   |   | x |   |   |
| - Photonics and Modern Imaging Techniques (2010 - 2013), joint call CNPq, Brazil                             |  |  |  |   |   |   | x |   |
| - Education research (CONICYT, Chile)  |  |  |  |   |   |   | x |   |
| - Materials for photonics, optoelectronics, solar cells and batteries (JST, Japan; Tekes)                    |  |  |  |   |   |   | x |   |
| - Photonics (RFBR, Russia)   |  |  |  |   |   |   | x |   |
| - The Health and Welfare of Children and Young People (2010 - 2014), joint call CIHR, Canada)                |  |  |  |   |   |   | x |   |
| - Future of Living (JSPS, Japan)   |  |  |  |   |   |   | x |   |
| - Green Chemistry (DST, India)   |  |  |  |   |   |   | x |   |
| - Biomaterials for medical applications and advanced materials for printed functionality (JST, Japan; Tekes) |  |  |  |   |   |   |   | x |
| - Climate Change (2011 - 2014), joint call with RFH, Russia  |  |  |  |   |   |   |   | x |
| - Climate Change (2011 - 2014), joint call with CAS, China   |  |  |  |   |   |   |   | x |
| - Climate Change (2011 - 2014), joint call with CASS, China  |  |  |  |   |   |   |   | x |
| - Food biotechnology (DBT, India)  |  |  |  |   |   |   |   | x |
| - Nanomaterials (DST, India)   |  |  |  |   |   |   |   | x |
| - Immunology (DFG, Germany; NSFC, China)   |  |  |  |   |   |   |   | x |

Academy of Finland; x = call launched; x (red) = ongoing/in portfolio 2012

**ERA:****Ongoing ERA-NETs:**

BONUS

NORFACE

CIRCLE2

ERA-AGE2

ERA-CHEMISTRY

ERA-LEARN ja ERA-LEARN2

ERA-NET RUS

ERA-NEURON

ERA-SYSBIO

HERA

MATERA

NanoSci-ERA

PATHOGENOMICS

WoodWisdomNet

WoodWisdom-Net2

New Indigo ERA-NET

**Completed ERA-NETs:**

CIRCLE

CO-REACH

ERA-PG

ERA-SAGE

MARINERA

PriMedChild

CO-REACH ERA-AGE

**Ongoing JPIs**

Neurodegenerative Disease Research ( JPND)

Agriculture, Food security and Climate Change (FACCE)

Connecting Climate Knowledge for Europe (JPI Climate)

More years Better Lives - The Potential and Challenges of Demographic Change

## B.4 Grants for infrastructure

| Grants for infrastructure | 2007 | 2008 | 2009 | 2010 | 2011 |
|---------------------------|------|------|------|------|------|
| FIRI 2010                 |      |      |      | x    |      |

Academy of Finland; x = call launched; Due to establishment of the Finnish Research Infrastructure Committee (FIRI Committee) in the Academy the concept is changing in 2012.

### Membership fees and national "responsibility"

|                |  |
|----------------|--|
| ESO            | The European Southern Observatory                                      |
| CERN           | The European Organisation for Nuclear Research                         |
| EMBC           | The European Molecular Biology Conference                              |
| EMBL           | The European Molecular Biology Laboratory                              |
| ESFR           | International research institute for cutting-edge science with photons |
| EUI            | The European University Institute                                      |
| ESF            | the European Science Foundation  |
| Science Europe |  |
| IIASA          | International Institute for Applied Systems Analysis                   |
| INCF           | International Neuroinformatics coordinating Facility                   |
| NeIC           | Nordic eInfrastructure Collaboration                                   |
| EISCAT         | The European Incoherent Scatterer Radar                                |
| ICDP           | The International Continental Scientific Drilling Programme            |
| ICLAS          | International Council for Laboratory Animal Science                    |
| IML            | Institut Mittag-Leffler  |
| IODP           | The Integrated Ocean Drilling Programme                                |
| NOT            | Nordic Optical Telescope   |
| GBIF           | Global Biodiversity Information Facility                               |

|       |   |
|-------|---|
| ESFRI | <b>Years 2010, 2011 and 2012 targeted funding to:</b><br>Integrated Carbon Observation System ICOS<br>European Life Science Infrastructure for Biological Information ELIXIR<br>Biobanking and Biomolecular Resources Research Infrastructure BBMRI<br>European Advanced Translational Research Infrastructure EATRIS |
|-------|---|

## B.5 International programmes

| International programmes   | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|------|------|------|------|------|------|------|------|
| Researcher training and research abroad  | x    | x    | x    | x    | x    |      |      |      |
| Researcher mobility from Finland   | x    | x    | x    | x    | x    | x    | x    | x    |
| Researcher mobility to Finland   | x    | x    | x    | x    | x    | x    | x    | x    |
| Finland distinguished professor programme (FiDiPro)  |      |      | x    |      | x    |      | x    |      |
| Work of foreign researchers in Finland   | x    |      |      |      |      |      |      |      |
| European Young Investigators Award EURYI   | x    | x    | x    |      |      |      |      |      |
| Grants for researcher training and research in the USA in fields supporting business know-how    | x    | x    |      |      |      |      |      |      |
| US-based researchers' visits to or research in Finland in fields supporting business know-how    |      |      |      | x    |      |      |      |      |
| Health research exchange programme between Finland and the Netherlands                           | x    | x    |      |      |      |      |      |      |
| Researcher training at European University Institut (EUI)  | x    | x    | x    |      |      |      |      |      |
| Postdoctoral researcher funding at European University Institut (EUI)                            |      |      |      | x    | x    | x    | x    | x    |
| Ageing research: FLARE 2 Postdoctoral Researchers  |      |      |      |      |      |      |      | x    |
| Travel funding to IIASA  |      |      | x    | x    | x    | x    | x    | x    |
| Finnish-German researcher training cooperation with DFG  |      |      |      | x    |      | x    |      |      |
| Preparation of international cooperation (joint) projects  | x    | x    | x    | x    | x    | x    |      |      |
| Subsidy for organising international scientific conferences***                                   | x    | x    | x    | x    | x    |      |      |      |
| <b>Nordic Centres of Excellence Programmes</b> (see Appendix A.3)                                |      |      |      |      |      |      |      |      |
| <b>Research programmes:</b>  |      |      |      |      |      |      |      |      |
| - Substance Use and Addictions (2007 - 2010)   |      |      | x    |      |      |      |      |      |
| <b>Targeted funding:</b>   |      |      |      |      |      |      |      |      |
| - Internationalisation of ageing research  | x    |      |      |      |      |      |      |      |
| - with NSF (U.S.A) for research projects in material science and engineering                     | x    | x    | x    | x    | x    | x    | x    | x    |
| - Core-to-Core programme of the Academy of Finland and JSPS (Japan)                              | x    |      |      |      |      |      |      |      |
| <b>Research projects jointly funded with foreign funding organisation:</b>                       |      |      |      |      |      |      |      |      |
| - Vaccine research, diagnostics and drug development (DBT, India)                                |      |      | x    |      |      |      |      |      |
| - Business know-how (RFH/Russia)   |      |      | x    |      |      |      |      |      |
| - Optic materials (RFBR/Russia)  |      |      | x    |      |      |      |      |      |
| - Cross-cultural communication (CASS, China)   |      |      |      | x    |      |      |      |      |
| - Life Sciences and Medical Sciences (JSPS, Japan)   |      |      |      | x    |      |      |      |      |
| - Material engineering and biosciences (RFBR, Russia)  |      |      |      | x    |      |      |      |      |
| - Plant and crop biotechnology (DBT, India)  |      |      |      | x    |      |      |      |      |
| - Environmental research (ASRT, Egypt)   |      |      |      | x    |      |      |      |      |
| - Ecology, environmental and energy research (NSFC, China)                                       |      |      |      | x    |      |      |      |      |
| - Sustainable energy (2008 - 2012), joint call with CONICYT, Chile                               |      |      |      | x    |      |      |      |      |
| - Environmental biotechnology (DBT, India)   |      |      |      |      | x    |      |      |      |
| - Ubiquitous Computing and Diversity of Communication (2009 - 2012), joint call with NSFC, China |      |      |      |      | x    |      |      |      |
| - Ubiquitous Computing and Diversity of Communication (2009 - 2012), joint call with RFH, Russia |      |      |      |      | x    |      |      |      |

|  |  |  |  |  |   |   |   |   |
|--|--|--|--|--|---|---|---|---|
| - Linguistics (RFH, Russia)  |  |  |  |  | x |   |   |   |
| - Sustainable Production and Products (2006 - 2013), joint call with ANR, France                             |  |  |  |  | x |   |   |   |
| - Ubiquitous Computing (JSPS, Japan)   |  |  |  |  | x |   |   |   |
| - Materials research (JST, Japan; Tekes)   |  |  |  |  |   | x |   |   |
| - Sustainable energy (2008 - 2012), joint call with CNPq, Brazil   |  |  |  |  |   | x |   |   |
| - Biomass-related research (ANR, France)   |  |  |  |  |   | x |   |   |
| - History (RFH, Russia)  |  |  |  |  |   | x |   |   |
| - Medical diagnostics (DBT, India; Tekes)  |  |  |  |  |   | x |   |   |
| - Signal processing and computational sciences (NSFC, China)   |  |  |  |  |   | x |   |   |
| - ELSA Genomics (BMBF, Germany; BMWF, Austria)   |  |  |  |  |   | x |   |   |
| - Sustainable energy (2008 - 2012), joint call with N-INNER (Nordic)   |  |  |  |  |   | x |   |   |
| - Photonics and Modern Imaging Techniques (2010 - 2013), joint call CNPq, Brazil                             |  |  |  |  |   |   | x |   |
| - Education research (CONICYT, Chile)  |  |  |  |  |   |   | x |   |
| - Materials for photonics, optoelectronics, solar cells and batteries (JST, Japan; Tekes)                    |  |  |  |  |   |   | x |   |
| - Photonics (RFBR, Russia)   |  |  |  |  |   |   | x |   |
| - The Health and Welfare of Children and Young People (2010 - 2013), joint call CIHR, Canada)                |  |  |  |  |   |   | x |   |
| - Future of Living (JSPS, Japan)   |  |  |  |  |   |   | x |   |
| - Green Chemistry (DST, India)   |  |  |  |  |   |   | x |   |
| - Biomaterials for medical applications and advanced materials for printed functionality (JST, Japan; Tekes) |  |  |  |  |   |   |   | x |
| - Climate Change (2011 - 2014), joint call with RFH, Russia  |  |  |  |  |   |   |   | x |
| - Climate Change (2011 - 2014), joint call with CAS, China   |  |  |  |  |   |   |   | x |
| - Climate Change (2011 - 2014), joint call with CASS, China  |  |  |  |  |   |   |   | x |
| - Food biotechnology (DBT, India)  |  |  |  |  |   |   |   | x |
| - Nanomaterials (DST, India)   |  |  |  |  |   |   |   | x |
| - Immunology (DFG, Germany; NSFC, China)   |  |  |  |  |   |   |   | x |

## B.6 Monodisciplinary programmes

| Monodisciplinary programmes                   | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|------|------|------|------|------|------|------|------|
| <b>International joint research projects:</b> |      |      |      |      |      |      |      |      |
| - Linguistics (RFH, Russia)                   |      |      |      |      | x    |      |      |      |

Academy of Finland; x = call launched; All the others in the portfolio are multidisciplinary.



## APPENDIX C

# Data input-output analysis

### C.1 Appraisal time

Data on the average appraisal time was available from the Academy for three type of grants (Figure 58). The appraisal time is defined here as the time between submitting the application and the announcement of the funding decision (granted/not granted). The average appraisal time is 6.79 months for applications that are not awarded and 6.87 months for those awarded. There is a minor difference in the average appraisal time ‘not granted’ and ‘granted’ and between the three types of grants. Appraising applications for research projects is more time consuming than the other two types of funding. A possible reason for the difference between those awarded and not awarded is that for sometimes a reserve list is used. If for example an applicant who has been granted funding decides not to accept it, the funding can be granted to an applicant on the

reserve list. There is also an example of the past when a research council decided to award additional funding that became available to an applicant on the reserve list.

There is no data available on the average appraisal time per year, so it is not known whether the appraisal time has decreased or increased over the years.

### C.2 Funding schemes without competition

In the funding schemes described below competition has taken place before the applicants send their applications to the Academy. Therefore all applicants are entitled to get funding (there is a 100% success rate). The text has been written by the Academy and has been slightly changed for the purpose of this report.

- Research costs of Academy Professor and Academy Research Fellow

Research costs are funded according to the full cost model at

Figure 58 Average appraisal time 2007-2011 (in months)

| Type of funding         | Not granted | Granted |
|-------------------------|-------------|---------|
| Academy Research Fellow | 6.43        | 6.50    |
| Academy project         | 7.31        | 7.48    |
| Postdoctoral Researcher | 6.64        | 6.64    |
| Average                 | 6.79        | 6.87    |

Academy of Finland

the Academy, but the salary funding of the Academy Professors and Academy Research Fellows are funded according to the additional cost model. As the Academy cannot handle in one application different cost models those who have been granted Academy Professor or Academy Research Fellow salary funding have to submit a separate application for research costs. These applications are all approved.

- Academy of Finland support to researchers successful in ERC Calls  
This call is by invitation only. All applicants get an Academy grant.
- Support to graduate schools and national researcher training courses  
This funding scheme no longer exists from 2012, as there are no more MEC-graduate schools. Before, the MEC nominated graduate schools that were eligible to apply and all got the grant.

- Provision for the university for salary increases in Academy funded projects (the Academy's share of the universities pay system)

When the universities changed their salary systems, they did not receive funds from the MEC for the salary increases of personnel of Academy funded projects. Therefore in the transition period the Academy allocated each university a lump sum to cover the raises in salaries; the sum was aggregated on the basis of existing projects.

- ERA-NETs and ESF funding schemes  
ERANet and ESF calls are not Academy funding schemes. Only those who have got funding decision made by ERANet or ESF submit their applications to the Academy. The Academy is not able to pay the funding to the researcher if the Academy does not get a formal application (so the acceptance rate is 100 %). In the early years of ERANets some ERANets recommended that all applicants should submit

Figure 59 Ranks of research organisations

| Organisation  | Number of AKA-Euros granted (2007-2011) | Total budget (2011)  | Total FTE research staff (2011) |
|---|---|----------------------|---------------------------------|
| University of Helsinki  | 526,388,226                             | 646,625,195          | 4253                            |
| Aalto University  | 190,962,821                             | 405,362,499          | 2826                            |
| University of Turku   | 172,452,687                             | 260,726,320          | 1731                            |
| Research institutes   | 151,386,543                             | Unknown              | Unknown                         |
| University of Jyväskylä   | 138,520,067                             | 218,797,526          | 1434                            |
| University of Oulu  | 110,320,991                             | 224,413,318          | 1578                            |
| University of Eastern Finland   | 107,593,382                             | 227,495,868          | 1452                            |
| University of Tampere   | 95,962,584                              | 176,166,921          | 1086                            |
| Tampere University of Technology  | 61,297,012                              | 148,058,965          | 1198                            |
| Åbo Akademi University  | 53,814,230                              | 114,510,526          | 750                             |
| Lappeenranta University of Technology   | 17,164,048                              | 76,099,079           | 508                             |
| University Hospitals  | 14,948,597                              | Unknown              | Unknown                         |
| University of Lapland   | 5,673,944                               | 53,953,247           | 284                             |
| University of Vaasa   | 5,036,283                               | 36,386,450           | 250                             |
| Hanken School of Economics  | 4,928,560                               | 21,441,428           | 120                             |
| Sibelius Academy  | 2,337,287                               | 36,466,387           | 253                             |
| Theatre Academy   | 1,186,700                               | 14,285,562           | 69                              |
| Academy of Fine Arts  | 254,550                                 | 8,488,882            | 35                              |
| Other (e.g. polytechnics, businesses, scientific societies, individual researcher, foreign organisations) | 186,439,164                             |                      |                                 |
| <b>Total</b>  | <b>1,846,667,676</b>                    | <b>2,669,278,173</b> | <b>17,827</b>                   |

Academy of Finland (2<sup>nd</sup> column); Ministry of Education and Culture (3<sup>rd</sup> and 4<sup>th</sup> column)

their applications both to the ERANet's coordinating organisation and to the national funding organisation (the Academy), which explains why the Academy has some rejected applications in their system.

- Grants for infrastructure

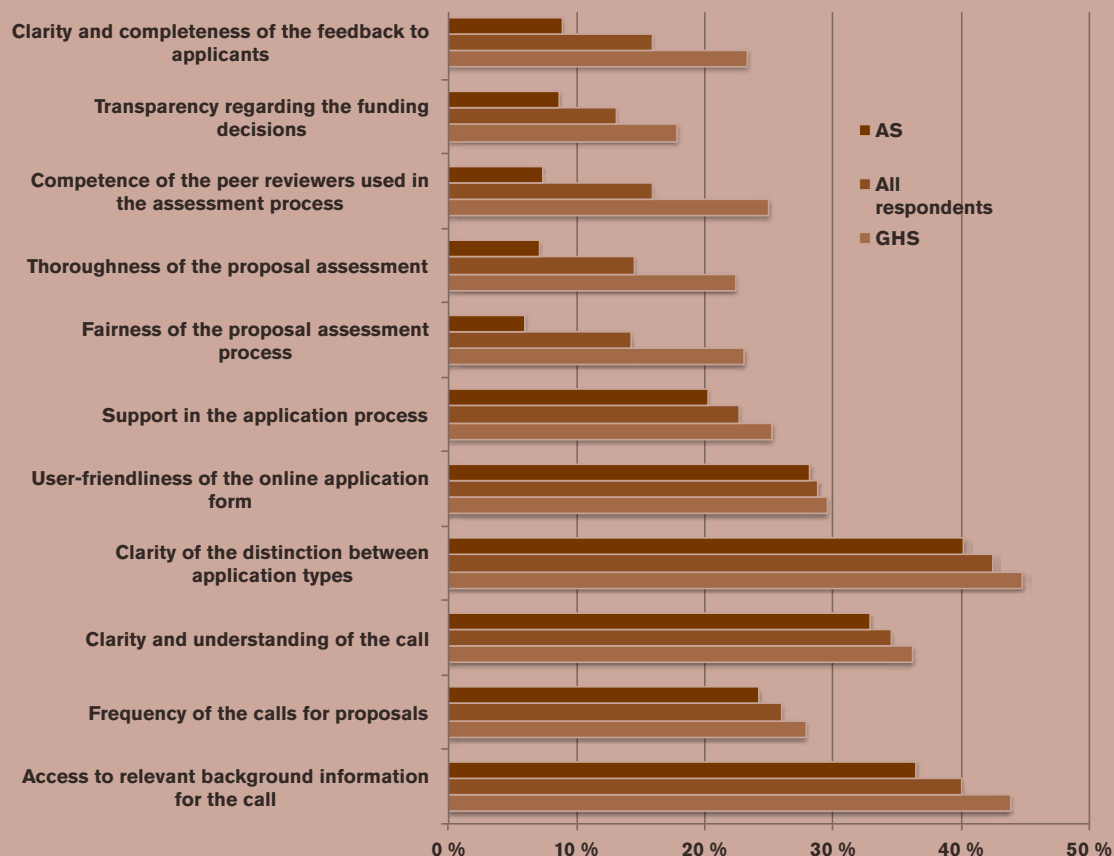
The calls Academy has had during 2007 – 2011 have been by invitation only, except for one in 2010 where only universities were eligible. The call in 2010 was according to the full cost model and the universities share was 30 %. When the call was launched the universities were not encouraged to submit many applications because Academy had only €10m funding available. However, after the call was closed MEC gave additional money to the Academy, which almost doubled the money available for funding decisions. The number of applications universities submitted would have been much higher if the extra funding would have been known before the call was closed.

## C.3 Comparison between research organisations

The ranking in amount of Euros received from the Academy corresponds with the ranking of the universities in total budgets (2011) and total FTE in research staff (2011), with only minor deviations. Total FTE research staff is defined here as all research and teaching staff at the universities. This includes all persons in the four-stage research career model and those only engaged in teaching (lecturers). Lecturers are included because that is the common way of calculating research and teaching staff (from the total lecturers share is 7 percent).

## C.4 Comparison satisfaction funding process

Figure 60 Percentage of respondents who agreed that the following characteristics of the funding process were completely satisfactory (Nr of respondents: AS=450, GHS=420)



Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

## APPENDIX D

# Online Survey

### D.1 Characteristics of the survey respondents

The Academy of Finland database of successful and unsuccessful applicants - 4007 individuals in total – contained a few out of date e-mail addresses and some duplications as well, therefore the final number of individuals invited to contribute to the online surveys was 3,886. At the time of closing the surveys, the number of responses received to the grant holder and non-successful applicant surveys were:

- 469 for the grant holder survey
- 544 for the unsuccessful applicant survey

The total 1,013 responses received represent an overall response rate of 26%. However, among the responses there were numerous partially completed responses and some duplications – when respondents filled in both surveys – therefore the final number of responses used by the study team was as follows:

- 420 responses for the grant holder survey
- 450 responses for the unsuccessful applicant survey

The total 870 responses received for the two surveys represent a 22.4% completion rate. Basic information was collected through the surveys, which enables the characterisation of the respondents in terms of the gender, age group and nationality.

As one might expect, higher education institutes dominate the respondents' organisational affiliation

in both surveys. Universities (86%) – both Finnish and foreign - and university hospitals (1.3%) account for over 87.3% of all the responses followed by responses received from representatives of research institutes (10.5%). There are a few responses also from other types of organisations such as government organisations, registered associations, and from individuals (unemployed and individual experts), but the share of these responses does not exceed 2.5% in total. The following table provides an overview of the organisational affiliations of the researchers who responded to the surveys in comparison with the results of the input-output analysis.

Comparison of the input-output analysis with the characteristics of the survey respondents in terms of organisational affiliation shows, that the surveys collected the views of a researcher community that broadly aligns with the Academy's funding distribution across the various organisations.

The surveys also asked respondents to indicate their main current position. The distribution of the respondents differ based on whether they are from Finland, from an other EU27 country or from a non-EU27 country. The following chart provides an overview of the characteristics of the respondents based on the country of origin.

In addition to gender distribution, nationality and organisational affiliation, the scientific fields of the respondents are also broadly in line with the overall

Figure 61 Basic information on the respondents

|                                      | Age group   | Gender                                      | Nationality   |
|--------------------------------------|---|---|---|
| <b>Grant holder survey</b>           | <i>n</i> =420<br>3% Below 30 years<br>73% Between 30-49 years<br>26% 50 years or more | <i>n</i> =413<br>62.9% Male<br>37.1% Female | <i>n</i> =420<br>EU27: 89.3%<br>- 77.1% Finnish<br>- 2.1% German<br>- 1.7% British<br>- 8.3% Other nationalities*<br>Non-EU27: 5.7%<br>- 1.4% American<br>- 1.2% Russian<br>- 1% Chinese<br>- 2.1% Other nationalities<br>Not available: 5% |
| <b>Unsuccessful applicant survey</b> | <i>n</i> =446<br>1% Below 30 years<br>73% Between 30-49 years<br>24% 50 years or more | <i>n</i> =443<br>64.6% Male<br>35.4% Female | <i>n</i> =450<br>EU27: 83.8%<br>- 73.1% Finnish<br>- 2% British<br>- 1.3% German<br>- 6.2% Other nationalities*<br>Non-EU27: 9.8%<br>- 2.2% Chinese<br>- 1.6% Russian<br>- 1.3% Indian<br>- 4.7% Other nationalities<br>Not available: 6.4% |

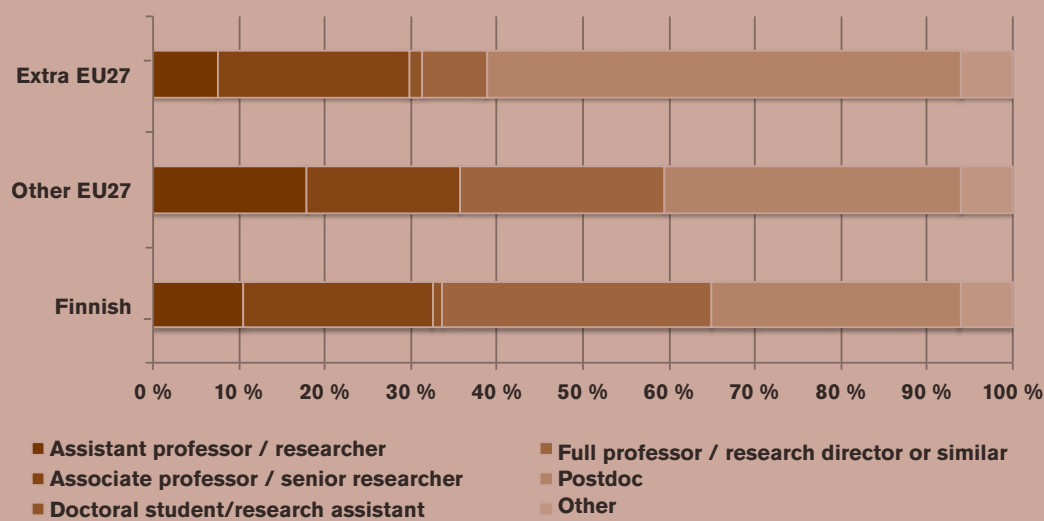
Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Notes: \* Including double nationality

Figure 62 Organisational affiliation of the survey respondents

| Research sites  |   | Input-output analysis              |                                   |                               | Surveys of researchers           |                     |                              |
|---|---|------------------------------------|-----------------------------------|-------------------------------|----------------------------------|---------------------|------------------------------|
|   |   | Applications received (% of total) | Granted applications (% of total) | Applicant survey (% of total) | Grant holder survey (% of total) | All respondents (%) | Total nr. of respondents (%) |
| Universities  | University of Helsinki                  | 26.8%                              | 30.6%                             | 21.3%                         | 27.9%                            | 24.5%               | 213                          |
|   | University of Turku                     | 11.1%                              | 11.0%                             | 10.9%                         | 8.6%                             | 9.8%                | 85                           |
|   | Aalto University                        | 10.3%                              | 10.8%                             | 7.8%                          | 10.0%                            | 8.9%                | 77                           |
|   | University of Jyväskylä                 | 8.2%                               | 8.0%                              | 6.4%                          | 9.8%                             | 8.0%                | 70                           |
|   | University of Eastern Finland           | 7.3%                               | 6.6%                              | 6.9%                          | 6.2%                             | 6.6%                | 57                           |
|   | University of Oulu                      | 8.6%                               | 7.5%                              | 5.3%                          | 6.7%                             | 6.0%                | 52                           |
|   | Tampere University of Technology        | 4.4%                               | 3.5%                              | 6.0%                          | 5.5%                             | 5.7%                | 50                           |
|   | University of Tampere                   | 5.9%                               | 6.2%                              | 3.8%                          | 3.1%                             | 3.4%                | 30                           |
|   | Åbo Akademi University                  | 3.9%                               | 3.5%                              | 3.3%                          | 2.9%                             | 3.1%                | 27                           |
|   | Lappeenranta University of Technology   | 1.5%                               | 1.0%                              | 1.8%                          | 0.2%                             | 1.0%                | 9                            |
|   | University of Vaasa                     | 0.5%                               | 0.5%                              | 0.4%                          | 0.2%                             | 0.3%                | 3                            |
|   | Hanken School of Economics              | 0.3%                               | 0.3%                              | 0.2%                          | 0.2%                             | 0.2%                | 2                            |
|   | University of Lapland                   | 0.7%                               | 0.5%                              |                               | 0.2%                             | 0.1%                | 1                            |
|   | Other universities (incl. foreign HEIs) |                                    |                                   | 9.8%                          | 6.4%                             | 8.2%                | 71                           |
| University Hospitals  |   | 1.2%                               | 0.9%                              | 1.8%                          | 0.7%                             | 1.3%                | 11                           |
| Research institutes   |   | 8.9%                               | 8.7%                              | 10.4%                         | 10.5%                            | 10.5%               | 91                           |
| Other organisations (incl. governmental org, individuals and registered associations) |   | 0.4%                               | 0.4%                              | 3.8%                          | 1.0%                             | 2.4%                | 21                           |
| TOTAL   |   | 18,142                             | 6,312                             | 450                           | 420                              | 870                 | 870                          |

Figure 63 Positions held by the survey respondents in different country groups: Finland (n=653), other EU27 (n=84) and extra EU27 (n=67)



Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 64 Profile of the survey respondents

| Research Council                 | Survey respondents |                     |       | Input-output analysis          |                                 |
|----------------------------------|--------------------|---------------------|-------|--------------------------------|---------------------------------|
|                                  | Applicant survey   | Grant holder survey | Total | Nr of applications (2007-2011) | Nr of projects funded (2007-11) |
| Biosciences and Environment      | 23%                | 21%                 | 22%   | 20%                            | 20%                             |
| Culture and Society              | 26%                | 25%                 | 26%   | 29%                            | 29%                             |
| Health                           | 13%                | 17%                 | 15%   | 16%                            | 17%                             |
| Natural Sciences and Engineering | 36%                | 37%                 | 36%   | 36%                            | 35%                             |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

proportion of the Academy funded projects and individual grants, therefore the survey sample can be regarded as representative of the total population of the Academy’s grants.

For the questions, whether respondents are members of specific research groups or have been affiliated with the Academy as panel members, reviewers or research Council members, the table below provides an overview.

## D.2 Survey results

The presentation of the survey results follows the structure and question numbering of the grant holder survey, as it includes all questions posed in the non-successful applicant survey in addition to specific ones, asked only from the grant holders of the Academy.



Figure 65 Are you a member of a specific research centre or group?

| Are you a member of a specific research centre or group...   | Yes (nr. of respondents) | Percentage of total respondents who answered yes | Total nr of respondents |
|--|--------------------------|--|-------------------------|
| that is part of the Academy's Centres of Excellence programme?   | 74                       | 9%   | 827                     |
| that is part of a SHOK?  | 113                      | 13%  | 862                     |
| Are you or have you in the past been a member of one or more of the Academy's Research Councils?                   | 19                       | 2%   | 860                     |
| Are you or have you in the past been a peer reviewer or panellist involved in assessing proposals for the Academy? | 83                       | 10%  | 858                     |

Source: Technopolis surveys - grant holders and applicants of the Academy of Finland, Dec 2012

Figure 66 Q1. Please provide us with the following basic information:

| Answer Options             | AS    |                | GHS   |                |
|----------------------------|-------|----------------|-------|----------------|
|                            | Blank | Response Count | Blank | Response Count |
| Your name:                 | 44    | 406            | 22    | 398            |
| Name of your organisation: | 40    | 410            | 23    | 397            |
| Your nationality:          | 29    | 421            | 21    | 399            |

Figure 67 Q2. What is your age range?

| Answer Options                  | GHS        |                  | AS         |                  |
|---------------------------------|------------|------------------|------------|------------------|
|                                 | Percentage | Nr. of responses | Percentage | Nr. of responses |
| Below 30 years                  | 1.4%       | 6                | 2.7%       | 12               |
| Between 30-49 years             | 72.6%      | 305              | 73.3%      | 327              |
| 50 years or more                | 26.0%      | 109              | 24.0%      | 107              |
| <b>Total nr. of respondents</b> |            | <b>420</b>       |            | <b>446</b>       |

Figure 68 Q3. Could you please indicate your gender?

| Survey       | Female     | Male       | Total      |
|--------------|------------|------------|------------|
| AS           | 157        | 286        | 443        |
| GHS          | 153        | 260        | 413        |
| <b>Total</b> | <b>310</b> | <b>546</b> | <b>856</b> |

Figure 69 Q4. What is your current (main) position?

| Survey   | AS         | GHS        | Total      |
|--|------------|------------|------------|
| Post doc   | 157        | 118        | 275        |
| Full professor / research director or similar      | 109        | 136        | 245        |
| Associate professor / senior researcher or similar | 97         | 89         | 186        |
| Assistant professor / researcher or similar        | 53         | 38         | 91         |
| Doctoral student/research assistant or similar     | 1          | 8          | 9          |
| University lecturer                                | 7          | 2          | 9          |
| Unemployed   | 5          | 1          | 6          |
| Other  | 14         | 21         | 35         |
| <b>Total</b>                                       | <b>443</b> | <b>413</b> | <b>856</b> |

Figure 70 Q5. What type of organisation do you work at?

| Survey                                      | AS         | AS (%)      | GHS        | GHS (%)     | Total      | Total (%)   |
|---|------------|-------------|------------|-------------|------------|-------------|
| University                                  | 378        | 84.0%       | 369        | 87.9%       | 747        | 85.9%       |
| Research institute                          | 47         | 10.4%       | 44         | 10.5%       | 91         | 10.5%       |
| University hospital                         | 8          | 1.8%        | 3          | 0.7%        | 11         | 1.3%        |
| Unemployed                                  | 6          | 1.3%        | 1          | 0.2%        | 7          | 0.8%        |
| Independent researcher                      | 3          | 0.7%        |            | 0.0%        | 3          | 0.3%        |
| Polytechnics                                | 2          | 0.4%        | 1          | 0.2%        | 3          | 0.3%        |
| Registered association / scientific society | 2          | 0.4%        | 1          | 0.2%        | 3          | 0.3%        |
| Company                                     | 1          | 0.2%        | 1          | 0.2%        | 2          | 0.2%        |
| Governmental organisation                   | 1          | 0.2%        |            | 0.0%        | 1          | 0.1%        |
| N/A   | 2          | 0.4%        |            | 0.0%        | 2          | 0.2%        |
| <b>Total</b>                                | <b>450</b> | <b>100%</b> | <b>420</b> | <b>100%</b> | <b>870</b> | <b>100%</b> |

Figure 71 Q6. What is your area of research?

| Area of research                                | AS         | GHS        | Total      |
|---|------------|------------|------------|
| Biosciences, including agriculture and forestry | 86         | 69         | 155        |
| Engineering                                     | 60         | 46         | 106        |
| Environment                                     | 14         | 17         | 31         |
| Humanities                                      | 57         | 26         | 83         |
| Medicine and health sciences                    | 57         | 68         | 125        |
| Natural sciences including mathematics          | 95         | 103        | 198        |
| Other, please specify                           | 20         | 14         | 34         |
| Social sciences                                 | 55         | 70         | 125        |
| (blank)   | 6          | 7          | 13         |
| <b>Total</b>                                    | <b>450</b> | <b>420</b> | <b>870</b> |

Figure 72 Q7. Are you a member of a specific research centre or group:

| Answer Options   | GHS |     |                    |       | AS  |     |                    |       |
|--|-----|-----|--------------------|-------|-----|-----|--------------------|-------|
|  | Yes | No  | I don't know / N/A | Total | Yes | No  | I don't know / N/A | Total |
| that is part of the Academy's Centres of Excellence programme? | 70  | 342 | 9                  | 421   | 43  | 392 | 9                  | 444   |
| that is part of a SHOK?  | 31  | 336 | 31                 | 398   | 43  | 362 | 24                 | 429   |

Figure 73 Q8. Are you or have you in the past:

| Answer Options   | GHS |     |                    |       | AS  |     |                    |       |
|--|-----|-----|--------------------|-------|-----|-----|--------------------|-------|
|  | Yes | No  | I don't know / N/A | Total | Yes | No  | I don't know / N/A | Total |
| been a member of one or more of the Academy's Research Councils?                   | 11  | 406 | 0                  | 417   | 8   | 433 | 2                  | 443   |
| been a peer reviewer or panellist involved in assessing proposals for the Academy? | 51  | 366 | 1                  | 418   | 32  | 406 | 2                  | 440   |

Figure 74 Q9. Please would you estimate the breakdown of your external research funding (that is not institutional funding) in 2012 that comes from:  
Please enter percentages in the boxes below, adding up to 100% in total.

| Answer Options                                  | Nr. of responses | Average amount of funding (%) |
|---|------------------|-------------------------------|
| The Academy (%)                                 | 524              | 68.1%                         |
| Tekes (%)                                       | 149              | 42%                           |
| Other Finnish sources (%)                       | 454              | 48.3%                         |
| The Framework Programme (including the ERC) (%) | 145              | 34.8%                         |
| Other foreign sources (%)                       | 139              | 34.9%                         |
| Total nr. of respondents                        | 746              |                               |

Figure 75 Q10. How attractive do you regard the following Academy of Finland, Tekes and European funding schemes as a funding source for your research activities?

| All respondents                        | Very attractive | Somewhat attractive | Neither attractive nor unattractive | Somewhat unattractive | Clearly unattractive | I don't know or N/A | Total (nr. of responses) |
|--|-----------------|---------------------|-------------------------------------|-----------------------|----------------------|---------------------|--------------------------|
| Academy Research Fellows               | 556             | 149                 | 36                                  | 9                     | 19                   | 76                  | 845                      |
| Academy Professors                     | 467             | 134                 | 77                                  | 8                     | 23                   | 134                 | 843                      |
| Postdoctoral researchers               | 529             | 154                 | 40                                  | 8                     | 40                   | 74                  | 845                      |
| Research environments, infrastructures | 170             | 222                 | 167                                 | 37                    | 41                   | 192                 | 829                      |
| CoE programme                          | 292             | 263                 | 121                                 | 33                    | 29                   | 104                 | 842                      |
| Open call research projects            | 490             | 206                 | 52                                  | 6                     | 4                    | 90                  | 848                      |
| Projects within research programmes    | 318             | 301                 | 92                                  | 24                    | 16                   | 91                  | 842                      |
| INCO projects funded by AKA            | 287             | 301                 | 108                                 | 37                    | 13                   | 89                  | 835                      |
| Tekes projects                         | 155             | 236                 | 163                                 | 85                    | 57                   | 139                 | 835                      |
| ERC grants                             | 393             | 247                 | 89                                  | 40                    | 14                   | 62                  | 845                      |
| EU FP projects                         | 198             | 340                 | 130                                 | 53                    | 22                   | 97                  | 840                      |
| NordForsk projects                     | 101             | 234                 | 160                                 | 37                    | 17                   | 279                 | 828                      |

Figure 76 Q11. Please indicate, how the schemes of the Academy compare with other national or international funding sources, concerning:

|  | Better | About the same | Poorer | I have no experience with other funding bodies | I don't know | Total (nr. of responses) |
|--|--------|----------------|--------|--|--------------|--------------------------|
| Opportunities for doing unique / original research             | 404    | 273            | 77     | 36   | 22           | 812                      |
| Opportunities for addressing high-risk topics                  | 265    | 266            | 142    | 44   | 92           | 809                      |
| Opportunities for developing new fields of enquiry             | 246    | 302            | 126    | 50   | 72           | 796                      |
| Support to new projects without requiring preliminary research | 109    | 284            | 225    | 42   | 114          | 774                      |
| Opportunities for doing interdisciplinary research             | 165    | 426            | 86     | 38   | 68           | 783                      |
| Opportunities for broadening your field of expertise           | 229    | 370            | 94     | 32   | 46           | 771                      |
| Support to young scientists                                    | 284    | 277            | 149    | 36   | 50           | 796                      |
| Provision of research infrastructure                           | 106    | 266            | 135    | 66   | 196          | 769                      |
| Amount of funding  | 249    | 298            | 169    | 38   | 26           | 780                      |
| Flexibility of use of funds                                    | 282    | 291            | 94     | 50   | 112          | 829                      |

Figure 77 Q12. Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory? (Results of the Applicant Survey)

|   | AS (nr. of responses) |              |            |                   |                |       |
|---|-----------------------|--------------|------------|-------------------|----------------|-------|
|   | Completely            | I don't know | Not at all | To a large extent | To some extent | Total |
| Access to relevant background information for the call          | 164                   | 3            | 5          | 187               | 63             | 422   |
| Frequency of the calls for proposals                            | 109                   | 7            | 37         | 162               | 107            | 422   |
| Clarity and understanding of the call                           | 148                   | 1            | 7          | 195               | 73             | 424   |
| Clarity of the distinction between application types            | 181                   | 2            | 9          | 172               | 61             | 425   |
| User-friendliness of the online application form                | 127                   | 0            | 15         | 203               | 80             | 425   |
| Support in the application process                              | 91                    | 54           | 19         | 159               | 98             | 421   |
| Fairness of the proposal assessment process                     | 27                    | 54           | 88         | 103               | 150            | 422   |
| Thoroughness of the proposal assessment                         | 32                    | 28           | 85         | 124               | 152            | 421   |
| Competence of the peer reviewers used in the assessment process | 33                    | 46           | 78         | 108               | 157            | 422   |
| Transparency regarding the funding decisions                    | 39                    | 22           | 128        | 90                | 145            | 424   |
| Clarity and completeness of the feedback to applicants          | 40                    | 7            | 86         | 108               | 182            | 423   |

Figure 78 Q12. Based on your most recent experience of applying for Academy funding, to what extent were the following characteristics of the funding process satisfactory? (Results of the Grant Holder Survey)

|  | GHS (nr. of responses) |              |            |                   |                |       |
|--|------------------------|--------------|------------|-------------------|----------------|-------|
|  | Completely             | I don't know | Not at all | To a large extent | To some extent | Total |
| Access to relevant background information for the call                         | 184                    | 4            | 3          | 180               | 30             | 401   |
| Frequency of the calls for proposals   | 117                    | 7            | 21         | 160               | 93             | 398   |
| Clarity and understanding of the call  | 152                    | 1            | 5          | 190               | 49             | 397   |
| Clarity of the distinction between application types                           | 188                    | 9            | 5          | 156               | 41             | 399   |
| User-friendliness of the online application form                               | 124                    | 1            | 16         | 188               | 72             | 401   |
| Support in the application process   | 106                    | 61           | 17         | 134               | 81             | 399   |
| Fairness of the proposal assessment process                                    | 97                     | 44           | 21         | 164               | 74             | 400   |
| Thoroughness of the proposal assessment  | 94                     | 28           | 15         | 180               | 82             | 399   |
| Competence of the peer reviewers used in the assessment process                | 105                    | 44           | 16         | 157               | 79             | 401   |
| Transparency regarding the funding decisions                                   | 75                     | 19           | 41         | 143               | 123            | 401   |
| Clarity and completeness of the feedback to applicants                         | 98                     | 9            | 23         | 150               | 117            | 397   |
| Time from application to grant   | 46                     | 4            | 91         | 115               | 142            | 398   |
| The overall cost efficiency of the application process                         | 61                     | 53           | 27         | 148               | 109            | 398   |
| Administrative obligations in the application, reporting and payment processes | 85                     | 39           | 21         | 169               | 85             | 399   |
| User-friendliness of the Reporting System                                      | 75                     | 108          | 14         | 142               | 57             | 396   |

Figure 79 Q13. How far do you feel that the amount of time spent on the application procedure taking into account the success rate of the schemes is:

| Answer Options                      | GHS              |                | AS               |                | All respondents  |                |
|-------------------------------------|------------------|----------------|------------------|----------------|------------------|----------------|
|                                     | Response Percent | Response Count | Response Percent | Response Count | Response Percent | Response Count |
| Very reasonable                     | 14%              | 56             | 3%               | 13             | 8%               | 69             |
| Reasonable                          | 54%              | 216            | 28%              | 120            | 41%              | 336            |
| Neither reasonable nor unreasonable | 16%              | 62             | 23%              | 98             | 19%              | 160            |
| Unreasonable                        | 12%              | 47             | 29%              | 123            | 21%              | 170            |
| Very unreasonable                   | 2%               | 7              | 14%              | 58             | 8%               | 65             |
| I don't know or N/A                 | 3%               | 12             | 3%               | 11             | 3%               | 23             |
| Total nr. of responses              | 100%             | 400            | 100%             | 423            | 100%             | 823            |

Figure 80 Q14. To what extent do you agree with the following statements?

| All respondents  | Agree fully | Agree partly | Neither agree nor disagree | Disagree partly | Disagree fully | I don't know | Total nr. of responses |
|--|-------------|--------------|----------------------------|-----------------|----------------|--------------|------------------------|
| The Academy selectively funds high quality research  | 257         | 408          | 72                         | 53              | 12             | 18           | 820                    |
| The degree of competition associated with Academy grants is a driver for quality                         | 214         | 373          | 93                         | 107             | 15             | 14           | 816                    |
| The different Academy funding schemes are accepted as legitimate by the research community               | 259         | 298          | 112                        | 51              | 12             | 83           | 815                    |
| Academy funding schemes duplicate those of other national sources (e.g. Tekes)                           | 21          | 100          | 169                        | 166             | 127            | 233          | 816                    |
| Academy funding schemes support the creation of a balanced portfolio across the various research domains | 65          | 239          | 173                        | 109             | 32             | 192          | 810                    |
| The strategies of the Academy are in line with the development needs of the research communities         | 68          | 306          | 165                        | 150             | 37             | 83           | 809                    |
| The strategies of the Academy are in line with the needs of industry                                     | 17          | 121          | 218                        | 83              | 37             | 331          | 807                    |
| The strategies of the Academy are in line with the needs of society                                      | 72          | 305          | 195                        | 91              | 27             | 120          | 810                    |
| Academy funds facilitate the international networking needed for my research institution                 | 215         | 325          | 121                        | 65              | 25             | 40           | 791                    |

Figure 81 Q15. How far do you feel that Academy funding schemes contribute to:

| All respondents   | Completely | To a large extent | To some extent | Not at all | I don't know | Total nr. of responses |
|---|------------|-------------------|----------------|------------|--------------|------------------------|
| Strengthening overall research capacities   | 228        | 420               | 130            | 4          | 23           | 805                    |
| Improved employment conditions of researchers   | 191        | 325               | 232            | 37         | 19           | 804                    |
| Access to state-of-the-art research facilities  | 80         | 280               | 286            | 45         | 110          | 801                    |
| Building new international scholarly networks   | 121        | 284               | 323            | 30         | 43           | 801                    |
| Creating critical mass with comparative advantage in given research fields                        | 109        | 270               | 273            | 43         | 102          | 797                    |
| Establishment of public-private partnerships across strategically important areas                 | 20         | 82                | 261            | 94         | 339          | 796                    |
| Ensuring wide access to results of publicly funded research through open access and dissemination | 76         | 197               | 297            | 74         | 157          | 801                    |

Figure 82 Q16. What is the impact of the Academy's funding schemes? Do they contribute to:

| All respondents   | Completely | To a large extent | To some extent | Not at all | I don't know | Total nr. of responses |
|---|------------|-------------------|----------------|------------|--------------|------------------------|
| Increased prestige and career opportunities for investigators who get funding     | 384        | 301               | 112            | 6          | 10           | 813                    |
| A stronger internal position for successful applicants within their organisations | 256        | 315               | 163            | 40         | 37           | 811                    |
| Improved national visibility  | 225        | 323               | 219            | 24         | 22           | 813                    |
| Improved international standing   | 140        | 262               | 318            | 55         | 37           | 812                    |
| Attracting other sources of funding   | 134        | 285               | 268            | 41         | 83           | 811                    |
| Improved utilisation of research results by others                                | 50         | 211               | 309            | 79         | 161          | 810                    |
| Strengthening innovation capabilities of others outside your organisation         | 50         | 131               | 241            | 81         | 289          | 792                    |

Figure 83 Q17. Please indicate the kind of grant you answer for and the first year of funding: (only GHS)

|  | Nr. of responses |
|--|------------------|
| Type of grant (name of the scheme / type of grant) | 379              |
| Year of project started                            | 376              |
| Duration of the grant                              | 373              |



Figure 84 Q18. To what extent were the following motives important to you when you applied for this particular project?

| All respondents   | Very important | Partly, sometimes a motive to apply | No, this is not important / No, this is not important in this research project | This scheme would not be helpful in achieving this | Motive not applicable | I don't know or N/A | Nr. of respondents |
|---|----------------|-------------------------------------|--|--|-----------------------|---------------------|--------------------|
| Gaining access to complementary expertise                                       | 218            | 307                                 | 177  | 15   | 39                    | 44                  | 800                |
| Gaining access to scientific excellence   | 381            | 252                                 | 105  | 10   | 33                    | 29                  | 810                |
| Potential to employ new staff and / or PhD students to strengthen your research | 453            | 128                                 | 89   | 52   | 56                    | 38                  | 816                |
| Creation of new or strengthening of existing national research networks         | 246            | 375                                 | 135  | 14   | 18                    | 19                  | 807                |
| Creation of new or strengthening of existing international research networks    | 402            | 315                                 | 63   | 10   | 13                    | 12                  | 815                |
| Creation or strengthening of collaboration with industry                        | 32             | 160                                 | 403  | 74   | 100                   | 37                  | 806                |
| Broadening our field of expertise   | 384            | 328                                 | 65   | 9  | 15                    | 11                  | 812                |
| Addressing specific scientific or technical questions, problems or issues       | 583            | 177                                 | 28   | 3  | 10                    | 10                  | 811                |
| Pursuing a research agenda  | 499            | 227                                 | 45   | 2  | 6                     | 28                  | 807                |
| Gaining access to research facilities / infrastructure                          | 156            | 275                                 | 293  | 30   | 34                    | 20                  | 808                |
| Conducting scientifically/technologically risky research                        | 291            | 276                                 | 171  | 12   | 43                    | 22                  | 815                |
| Conducting cross-sector research  | 160            | 293                                 | 228  | 24   | 40                    | 60                  | 805                |
| Conducting interdisciplinary research   | 334            | 319                                 | 114  | 13   | 13                    | 17                  | 810                |
| Conducting research in collaboration with key international institutions        | 327            | 315                                 | 113  | 11   | 13                    | 17                  | 796                |

Figure 85 Q19. To what extent were the following motives important to you when you applied for this particular project? (only GHS)

|   | Agree fully | Agree partly | Neither agree nor disagree | Disagree partly | Disagree fully | I don't know or N/A | Total nr. of responses |
|---|-------------|--------------|----------------------------|-----------------|----------------|---------------------|------------------------|
| Through the project new research areas of significant importance for our future research / innovation activities have been explored | 246         | 102          | 10                         | 1               | 0              | 14                  | 373                    |
| The project helps our research to gain/maintain a position at the scientific forefront in our area                                  | 240         | 107          | 13                         | 0               | 0              | 12                  | 372                    |
| The project has produced or is about to produce novel scientific results/breakthrough findings                                      | 209         | 124          | 20                         | 3               | 0              | 17                  | 373                    |
| The project lead to significantly increased publication output  | 168         | 138          | 35                         | 7               | 4              | 20                  | 372                    |
| Our research and innovation management skills have been significantly improved as a result of the project                           | 133         | 137          | 60                         | 8               | 4              | 31                  | 373                    |
| A new research group was established as a result of the project   | 100         | 100          | 51                         | 22              | 62             | 36                  | 371                    |
| The project leads/contributes to innovation (improved product, process or organisational method)                                    | 99          | 123          | 65                         | 16              | 13             | 56                  | 372                    |
| The project has changed our research activities towards larger collaborative projects   | 92          | 134          | 71                         | 26              | 21             | 24                  | 368                    |
| The project has enabled us successfully to compete for funding from other external national sources                                 | 73          | 107          | 68                         | 24              | 25             | 73                  | 370                    |
| The project has enabled us successfully to compete for international funding (within or outside of the EU Framework Programme)      | 43          | 68           | 98                         | 27              | 34             | 96                  | 366                    |
| The project has changed our way of doing research   | 37          | 120          | 113                        | 44              | 29             | 26                  | 369                    |

Figure 86 Q20. Beyond the grant period (only GHS)

| Answer Options  | Yes | No | I don't know or N/A | Total nr. of responses |
|---|-----|----|---------------------|------------------------|
| Is there a strategy for continuation of the work of the project?                | 308 | 34 | 36                  | 378                    |
| Will you apply for follow-up funding to ensure the continuation of the project? | 277 | 27 | 73                  | 377                    |
| Will further use be made of the acquired knowledge?                             | 350 | 2  | 25                  | 377                    |
| Will the partnership continue?  | 306 | 8  | 62                  | 376                    |
| Will the project continue to have an impact?                                    | 330 | 2  | 45                  | 377                    |
| Will follow-on activities take place?   | 295 | 12 | 69                  | 376                    |
| Other, please specify below   | 21  | 6  | 80                  | 107                    |
| Other (please specify)  |     |    |                     | 35                     |

Figure 87 Q21. Have you engaged in any international research project collaboration since 2004?

| Answer Options                          | GHS |     |                        | AS  |     |                        |
|---|-----|-----|------------------------|-----|-----|------------------------|
|   | Yes | No  | Total nr. of responses | Yes | No  | Total nr. of responses |
| Projects funded by the Academy          | 207 | 156 | 363                    | 176 | 199 | 375                    |
| Project funded by other national bodies | 159 | 192 | 351                    | 189 | 188 | 377                    |
| Projects funded by international bodies | 257 | 117 | 374                    | 248 | 142 | 390                    |

Figure 88 Q22. Could you please describe the type of international project(s) in which you are / were engaged? Please select all that apply.

| Answer Options                                | GHS | AS  | All respondents |
|---|-----|-----|-----------------|
| Other Framework Programme research project    | 115 | 111 | 226             |
| Other international programme                 | 81  | 83  | 164             |
| Nordic project                                | 70  | 79  | 149             |
| COST Action                                   | 64  | 57  | 121             |
| Project conducted under a bilateral agreement | 60  | 54  | 114             |
| ERC   | 41  | 39  | 80              |
| Other European programme                      | 29  | 32  | 61              |
| ESF programme or network                      | 27  | 17  | 44              |

Figure 89 Q23. Could you please describe your role in the international project(s) in which you are / were engaged? Please select all that apply

| Answer Options                      | GHS        | AS         | All respondents |
|-------------------------------------|------------|------------|-----------------|
| Project coordinator                 | 75         | 63         | 138             |
| Project participant with major role | 179        | 196        | 375             |
| Project participant with minor role | 132        | 149        | 281             |
| Other, please specify               | 15         | 0          | 15              |
| <b>Nr. of respondents</b>           | <b>287</b> | <b>310</b> | <b>597</b>      |

Figure 90 Q24. To what extent do you agree with the following statements about the Academy's support for the internationalisation of research?

| All respondents  | Agree fully | Agree partly | Neither agree, nor disagree | Disagree partly | Disagree fully | I don't know or N/A | Total nr. of responses |
|--|-------------|--------------|-----------------------------|-----------------|----------------|---------------------|------------------------|
| Information on how various Academy schemes may be used for internationalisation purposes is easily accessible          | 122         | 336          | 153                         | 87              | 12             | 62                  | 772                    |
| The Academy offers a broad spectrum of schemes that provide the opportunity to get engaged in international activities | 122         | 322          | 151                         | 93              | 11             | 75                  | 774                    |
| The Academy provides enough support to make me willing to apply to enter international research collaboration          | 123         | 246          | 181                         | 134             | 25             | 64                  | 773                    |
| The Academy provides adequate support to international mobility attractive at an appropriate time in one's career      | 159         | 305          | 128                         | 97              | 27             | 56                  | 772                    |
| The Academy's support to international mobility helps the career development of individual researchers                 | 222         | 316          | 113                         | 50              | 17             | 55                  | 773                    |
| Academy schemes are useful in terms of attracting foreign talent to Finland  | 112         | 270          | 152                         | 92              | 26             | 121                 | 773                    |
| The Academy provides enough support to give me adequate access to international research infrastructures               | 71          | 188          | 213                         | 87              | 38             | 170                 | 767                    |
| The Academy's internationalisation policies support research excellence in Finland                                     | 126         | 287          | 145                         | 80              | 27             | 102                 | 767                    |
| The Academy's funding schemes are complementary to those of international sources                                      | 121         | 246          | 169                         | 48              | 15             | 167                 | 766                    |

Figure 91 Q25. For Finland, and your unit in particular, what are the challenges in the internationalisation of research?

| All respondents   | Agree fully | Agree partly | Neither agree nor disagree | Disagree partly | Disagree fully | I Don't know or N/A | Total nr. of responses |
|---|-------------|--------------|----------------------------|-----------------|----------------|---------------------|------------------------|
| International activities weaken domestic cooperation  | 22          | 116          | 98                         | 184             | 338            | 16                  | 774                    |
| International activities strengthen foreign competitors   | 29          | 117          | 169                        | 184             | 222            | 49                  | 770                    |
| International activities tend to create more problems regarding Intellectual Property than do national activities | 21          | 115          | 157                        | 137             | 196            | 146                 | 772                    |
| Overall, the costs of international activities outweigh the benefits  | 33          | 89           | 112                        | 193             | 301            | 42                  | 770                    |
| Mobility and "brain drain": There are more highly skilled people leaving Finland than move to Finland             | 73          | 205          | 150                        | 137             | 87             | 120                 | 772                    |
| We are not able to get much out of Finland's participation in the EU framework programme                          | 41          | 169          | 138                        | 142             | 93             | 187                 | 770                    |
| The Academy support schemes for international research collaboration are not adequate for our needs               | 49          | 199          | 212                        | 131             | 57             | 120                 | 768                    |
| Academy support for collaboration with partners outside the EU is inadequate                                      | 62          | 154          | 202                        | 96              | 36             | 219                 | 769                    |

Figure 92 Q26. How responsive do you find the Academy to inputs from the research community about:

| Answer Options |  | Very responsive | Somewhat responsive | Not responsive at all | I don't know or N/A | Total nr. of responses |
|----------------|--|-----------------|---------------------|-----------------------|---------------------|------------------------|
| <b>GHS</b>     | Needs for change in research funding rules or schemes?                           | 28              | 163                 | 46                    | 140                 | 377                    |
| <b>AS</b>      |  | 19              | 169                 | 74                    | 141                 | 403                    |
| <b>GHS</b>     | Changes in thematic priorities, for example by starting new research programmes? | 39              | 171                 | 17                    | 147                 | 374                    |
| <b>AS</b>      |  | 30              | 184                 | 41                    | 147                 | 402                    |

Figure 93 Q27. How well does the Academy communicate about its work and the impacts of its funding?

| Answer Options         |                           | Very effective | Somewhat effective | Not effective at all | I don't know or N/A | Total nr. of responses |
|------------------------|---------------------------|----------------|--------------------|----------------------|---------------------|------------------------|
| <b>AS</b>              | To the research community | 60             | 258                | 52                   | 33                  | 403                    |
|                        | To industry               | 3              | 50                 | 45                   | 302                 | 400                    |
|                        | To the general public     | 15             | 147                | 90                   | 150                 | 402                    |
| <b>GHS</b>             | To the research community | 82             | 233                | 31                   | 30                  | 376                    |
|                        | To industry               | 4              | 46                 | 32                   | 294                 | 376                    |
|                        | To the general public     | 22             | 165                | 54                   | 134                 | 375                    |
| <b>All respondents</b> | To the research community | 142            | 491                | 83                   | 63                  | 779                    |
|                        | To industry               | 7              | 96                 | 77                   | 596                 | 776                    |

Figure 94 Q28. How do you see the role of the Academy in the future? Should there be a shift in its activities (basic research versus focus on strategic research)?

| Answer Options  | AS           |                  | GHS          |                  | All respondents |                  |
|---|--------------|------------------|--------------|------------------|-----------------|------------------|
|   | Response (%) | Nr. of responses | Response (%) | Nr. of responses | Response (%)    | Nr. of responses |
| No, the Academy has a balanced portfolio of activities.       | 16%          | 61               | 34%          | 126              | 25%             | 187              |
| Yes, there should be more focus on mainstream basic research. | 28%          | 110              | 20%          | 73               | 24%             | 183              |
| Yes, there should be more focus on risky basic research.      | 41%          | 161              | 36%          | 133              | 39%             | 294              |
| Yes, there should be more focus on strategic research         | 14%          | 56               | 10%          | 37               | 12%             | 93               |
| Total nr. of responses  |              | 388              |              | 369              |                 | 757              |

Figure 95 Q29. Suggestions, recommendations and other comments

| Answer Options   | AS               |                  | GHS              |                  | All respondents  |                  |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
|  | Response Percent | Nr. of responses | Response Percent | Nr. of responses | Response Percent | Nr. of responses |
| Do you have any suggestions for topics that you believe should be given (more) attention in the future?                          | 70.4%            | 145              | 70.4%            | 145              | 70.4%            | 145              |
| Do you have any suggestions, recommendations regarding future Academy funding that support national or international activities? | 43.2%            | 89               | 43.2%            | 89               | 43.2%            | 89               |
| Please provide any additional comments you may have.   | 49.0%            | 101              | 49.0%            | 101              | 49.0%            | 101              |

## APPENDIX E

### List of Interviewees

Figure 96 List of interviewees

| Organisation   | Name                |
|--|---------------------|
| Aalto University   | Mikko Möttönen      |
| Aalto University   | Tuija Pulkkinen     |
| Aalto University   | Riitta Hari         |
| Aalto University   | Tuula Teeri         |
| Aalto University - Finnish Centre of Excellence in Computational Nanoscience | Tapio Ala-Nissilä   |
| Åbo Akademi University   | Jyri-Pekka Mikkola  |
| Åbo Akademi University   | Pia Vuorela         |
| AKA Board  | Jorma Mattinen      |
| AKA Chair, RIC   | Arto Mustajoki      |
| AKA President  | Heikki Mannila      |
| AKA Vice President Research  | Marja Makarow       |
| AKA Ex Vice President Research   | Riitta Mustonen     |
| AKA Staff  | Ulla Ellmén         |
| AKA Staff  | Maiju Gyran         |
| AKA Staff  | Anne Heinänen       |
| AKA Staff  | Satu Huuha-Cissokho |
| AKA Staff  | Eeva Ikonen         |
| AKA Staff  | Merja Kärkkäinen    |
| AKA Staff  | Hannele Kurki       |
| AKA Staff  | Jarmo Laine         |
| AKA Staff  | Juha Latikka        |
| AKA Staff  | Riitta Launonen     |
| AKA Staff  | Maaria Lehtinen     |
| AKA Staff  | Kyösti Lempa        |
| AKA Staff  | Päivi Messo-Lindén  |
| AKA Staff  | Sirpa Nuotio        |

|  |                         |
|--|-------------------------|
| AKA Staff                              | Tiina Petänen           |
| AKA Staff                              | Pentti Pulkkinen        |
| AKA Staff                              | Jukka Reivinen          |
| AKA Staff                              | Jaana Roos              |
| AKA Staff                              | Aki Salo                |
| AKA Staff                              | Ritva Taurio            |
| AKA Staff                              | Mikko Ylikangas         |
| Chair RC Sciences and Engineering      | Erkki Oja               |
| Chair RC Culture and Society           | Aila Lauha              |
| Chair RC Health, AKA Board             | Tuula Tamminen          |
| European University Institute          | Bo Strath               |
| Ex-RIC secretary general               | Ilkka Turunen           |
| RIC secretary                          | Anssi Mälkki            |
| Federation of Finnish Industries       | Hannele Pohjola         |
| FIBIC SHOK                             | Christine Hagström-Näsi |
| Finnish Academy of Science and Letters | Olli Martio             |

|  |                    |
|--|--------------------|
| Finnish Environment Institute                          | Anke Kremp         |
| Finnish Environment Institute (SYKE)                   | Mari Walls         |
| Finnish Forest Research Institute                      | Hannu Raitio       |
| Finnish Institute of Occupational Health               | Jussi Vahtera      |
| Finnish Meteorological Institute                       | Minna Palmroth     |
| Folhålsan  | Johan Eriksson     |
| Former Director-General at MEC                         | Sakari Karjalainen |
| Former University rector; Minister                     | Antti Tanskanen    |
| Goteborg University                                    | Roger Saljo        |
| Graduate Institute of International Studies, Geneva    | Jussi Hanhimäki    |
| Institute of Theoretical Physics, University of Warsaw | Jacek Dobaczewski  |
| MEC, RIC   | Tuomas Parkkari    |
| National Institute for Health and Welfare              | Eero Kajantie      |
| National Institute for Health and Welfare              | Tiina Paunio       |
| Retired  | Esko-Olavi Seppälä |
| RIC  | Pertti Haapala     |
| RIC  | Risto Lammintausta |
| Royal Institute of Technology                          | Ari T. Friberg     |
| SALWE SHOK   | Saara Hassinen     |
| SHOK Coordinator SalWe                                 | Ilkka Julkunen     |
| SITRA  | Mikko Kosonen      |
| Tampere University of Technology                       | Jussi Tohka        |
| Tampere University of Technology                       | Ilpo Vattulainen   |
| Technical University of Denmark                        | Antti-Pekka Jauho  |
| TEKES, Competence areas and int'l network              | Riikka Heikinheimo |
| TEM  | Paula Nybergh      |



|   |                       |
|---|-----------------------|
| TEM   | Petri Lehto           |
| MEC, state secretary                          | Tapio Kosunen         |
| TEM, RIC                                      | Kai Husso             |
| The Family Federation                         | Anna Rotkirch         |
| The National Institute for Health and Welfare | Pekka Puska           |
| TIVIT SHOK                                    | Pauli Kuosmanen       |
| University of Helsinki                        | Anna-Liisa Laine      |
| University of Helsinki                        | Ari Laaksonen         |
| University of Helsinki                        | Arto Urtti            |
| University of Helsinki                        | Elina Ikonen          |
| University of Helsinki                        | Ilkka Hanski          |
| University of Helsinki                        | Ilkka Niiniluoto      |
| University of Helsinki                        | Kari Enqvist          |
| University of Helsinki                        | Maija Tenkanen        |
| University of Helsinki                        | Maria Vartiainen      |
| University of Helsinki                        | Markku Kulmala        |
| University of Helsinki                        | Mart Saarma           |
| University of Helsinki                        | Petra Tallberg        |
| University of Helsinki                        | Petri Ala-Laurila     |
| University of Helsinki                        | Matti Sintonen        |
| University of Helsinki                        | Mikael Knip           |
| University of Helsinki                        | Olli Mäenpää          |
| University of Helsinki                        | Tapani Kaakkuriniemi  |
| University of Helsinki                        | Yrjö Helariutta       |
| University of Jyväskylä                       | Johanna Mappes        |
| University of Jyväskylä                       | Pauline von Bonsdorff |
| University of Jyväskylä                       | Teppo Kröger          |
| University of Oulu                            | Riitta Keiski         |
| University of Tampere                         | Howard Jacobs         |
| University of Tampere                         | Jouni Häkli           |
| University of Tampere                         | Tarja Väyrynen        |
| University of Turku                           | Craig Primmer         |
| University of Turku                           | Jani Erola            |
| University of Turku                           | Sirpa Jalkanen        |
| VTT   | Erkki Leppävuori      |

## APPENDIX F

# Approach and Methodology

The work plan of the evaluation comprises six Work Packages (plus a WP on project management). The figure below shows the Work Packages, which are explained in more detail below.

Work Package 1: The kick-off period. This period involved some preliminary discussions with the Academy and the Ministry followed by a more formal kick-off meeting with the Ministry in September 2012. During the kick-off meeting the approach to the evaluation was validated. Furthermore agreements were made on the provision of data, documents, etc.

Work Package 2: Preparation and desk research. After the kick-off period we analysed all relevant documents and internal data. Five subtasks were defined:

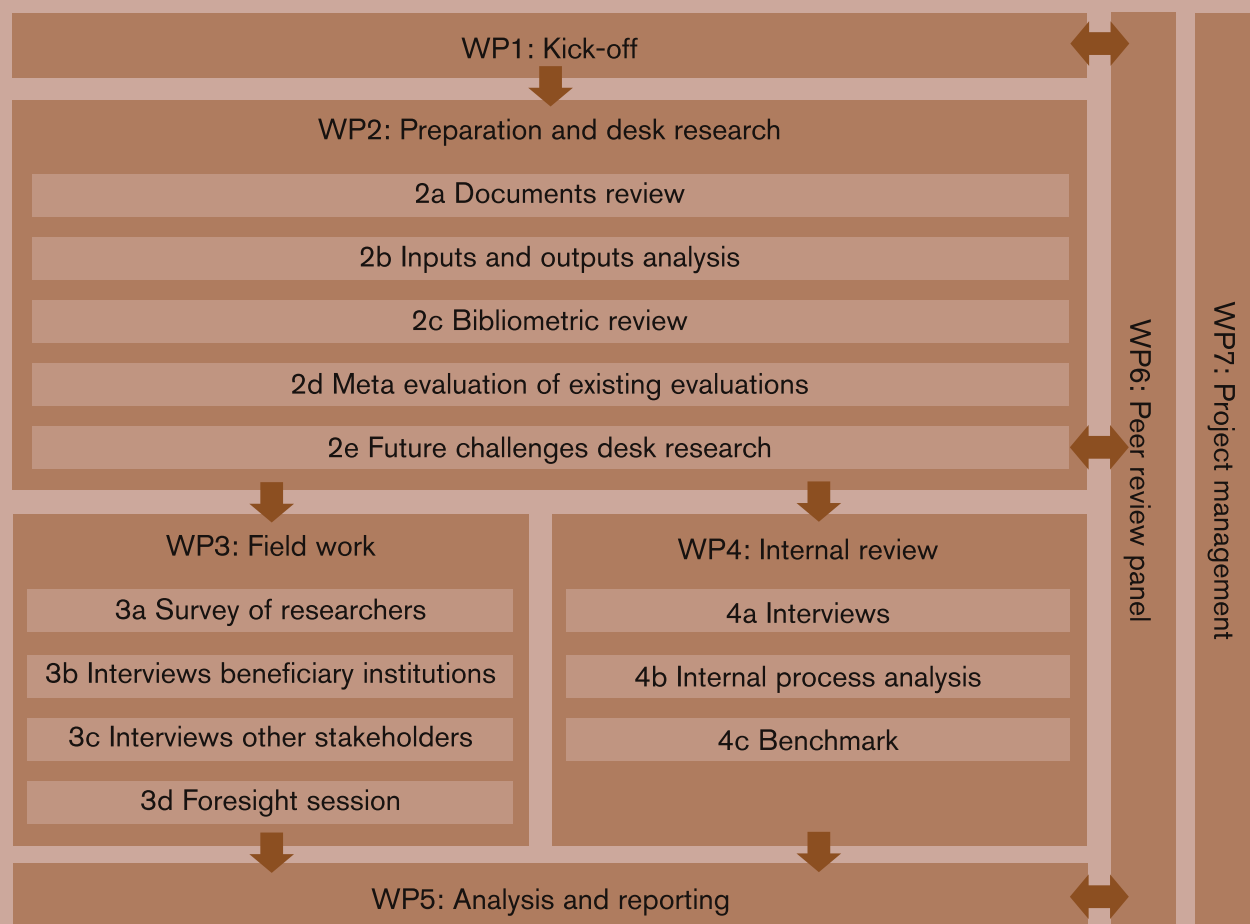
- Document review: In this task relevant documents were gathered and studied, including policy documents, governance related documents (statutes, performance contracts, reporting), historical documents (including annual reports), internal procedure manuals, external documents on the Academy and the Finnish research system and other relevant documents.
- Input and output analysis: Based on the data available within the Academy the development of the Academy as a funding agency was sketched (e.g. budget, success rate, gender, etc.).

- Bibliometric review: conducted by CSC – IT Centre for Science.
- Meta-evaluation: All relevant Finnish evaluations from the past years, including Academy evaluations (of subfields, programmes, etc.), the Finnish system evaluation, evaluations of international cooperation, analysis of Finnish FP participation, and evaluations of other major actors and programmes (Tekes, SITRA, SHOKs, etc) were analysed in relation to the role and functioning of the Academy.
- Future challenges desk research: In order to provide recommendations for the future, future challenges for the Academy were identified by assembling and analysing relevant literature on the foreseen trends and developments in the Finnish society, at EU level and beyond.

Work Package 3: Field work. As part of this Work Package additional information was gathered about the Academy from sources outside the Academy. Four subtasks were carried out

- Survey of researchers: All researchers who received support from the Academy during the last five years and all unsuccessful applicants who applied for an Academy grant were invited to complete an online survey.
- Interviews with beneficiary institutions at top management and research group level: to understand the impacts of the Academy at institutional level, to verify survey results and to gather more in-depth information and opinions on the main evaluation questions.
- Interviews with other stakeholders: The goal of this subtask was to obtain the views of representatives of other parts of the Finnish research and innovation system regarding

Figure 97 Evaluation approach



the boundaries and responsibilities of the Academy from a systemic perspective.

- Foresight session: We organised a workshop on future trends and challenges in February 2013. During the workshop, participants discussed not only the emergence of certain trends but also the consequences for the Academy. The workshop built on the desk research that was carried out in Work Package 2 on future challenges.

Work Package 4: Internal review. This Work Package addressed the internal processes of the Academy and the Academy's organisation (including the governance of the Academy). We gathered information about the steering (including legal surroundings, performance steering, other interaction with Ministry), the strategy setting process, operations (application and selection procedures, decision-making process, etc.) and the internal organisation (governance structure, financial and administration processes, etc.). For this Work Package we conducted interviews with Academy personnel representing different management levels (board, management, programme and project officers) and segments of the organisations (the various councils, support staff, etc.). We also carried out an international benchmark study. For the benchmark exercise we analysed three foreign organisations with comparable goals and remit to the Academy: VR (Sweden), FWF (Austria) and NWO (The Netherlands).

Work Package 5: Analysis and reporting. All of the Work Packages described above contributed to our understanding of the key evaluation topics and provided solid evidence, which amalgamated a diversity of perspectives and viewpoints. We synthesised the results into this report for the review panel. The aim of the report is to provide the panel with inputs to support the review.

Work Package 6: Peer review panel. We provided the panel with an interim report. This report – together with the self-evaluation of the Academy of Finland – was the starting point for the panel review. The review involved a panel of scientists (one from each of the four Academy council domains) who have extensive experience of science policy. The panel members were:

- Susan E. Cozzens, Professor of Public Policy, Director of the Technology Policy and Assessment Centre, Georgia Tech (Social science and Humanities).
- Jos van der Meer (The Netherlands), Professor of Internal Medicine and Chairman of the Division of General Internal Medicine at Radboud University Nijmegen Medical Centre and vice-president of the Department of Natural Sciences of the Royal Netherlands Academy of Arts and Sciences (Health and Medicine).
- Jens Nielsen, Professor of Systems Biology and Director of the Area of Advance Life Science at Chalmers University of Technology (Biosciences and environment).
- Sir John O'Reilly (UK), Professor in Information and Communication Technologies, with an emphasis on communication networks and applications. Formerly director of the Engineering and Physical Sciences Research Council of the UK, until recently, he was Vice Chancellor of Cranfield University. He is now Director General for Knowledge and Innovation in the UK Department for Business, Innovation and Skills.

The panel had been involved in the evaluation since the beginning. The aim of its involvement in the first stage was to validate our approach. The main focus of the panel activities was on the site visit at the Academy of Finland carried out on the 8th and 9th April 2013. During this site visit the panel had the opportunity to interact with representatives of the Academy as well as other stakeholders and beneficiaries. The expert panel prepared a separate report with their findings, which served as a major input for the final evaluation report.

- 1 Toiminta- ja taloussuunnitelma 2014–2017
- 2 Liikuntatoimi tilastojen valossa;  
Perustilastot vuodelta 2011
- 3 Sivistystä vapaasti kaikille? Tutkimus  
kansalaisopistojen ja kansanopistojen  
esteettömyydestä
- 4 Yliopistojen tieteellinen ja taiteellinen toiminta  
sekä yhteiskunnallinen vaikuttavuus vuonna  
2011. Yhteenvedo yliopistoilta kerätyistä  
julkaisutiedoista
- 5 Taidetta arkeen; Selvitys valtion keinoista  
edistää prosenttiperiaatetta osana julkista  
rakentamista
- 6 Matkailu ja kulttuurin syke; Kulttuurin  
matkailullinen tuotteistaminen -toimintaohjelman  
2009–2013 loppuraportti
- 7 Perusopetuksen laatutyö. Erilaisia tapoja ottaa  
laatukriteerit hallintaan
- 8 Koulujen alueelliset haasteet ja rahoituksen  
kohdentuminen
- 9 Opetus- ja kulttuuriministeriön älystrategia;  
OKM-KIDE
- 10 Mediakasvatus kuntien varhaiskasvatuksessa
- 11 Hyvä medialukutaito; Suuntaviivat 2013–2016
- 15 Linjaukset liikuntatutkimuksen tukemiseksi  
vuoteen 2017; Liikuntatutkimuksen suunta-  
asiakirja



Opetus- ja kulttuuriministeriö

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